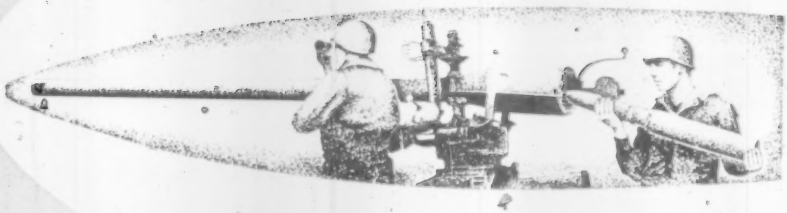
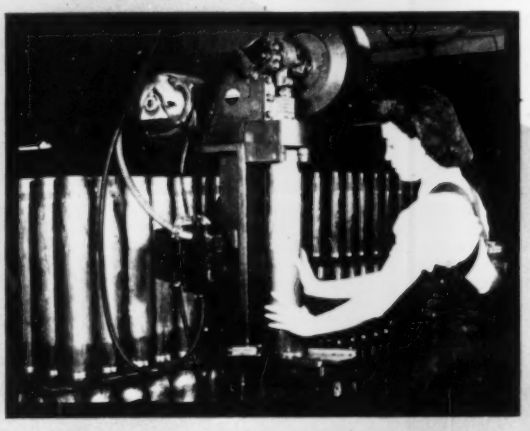
JULY 9, 1951

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

Steel Shell Cases

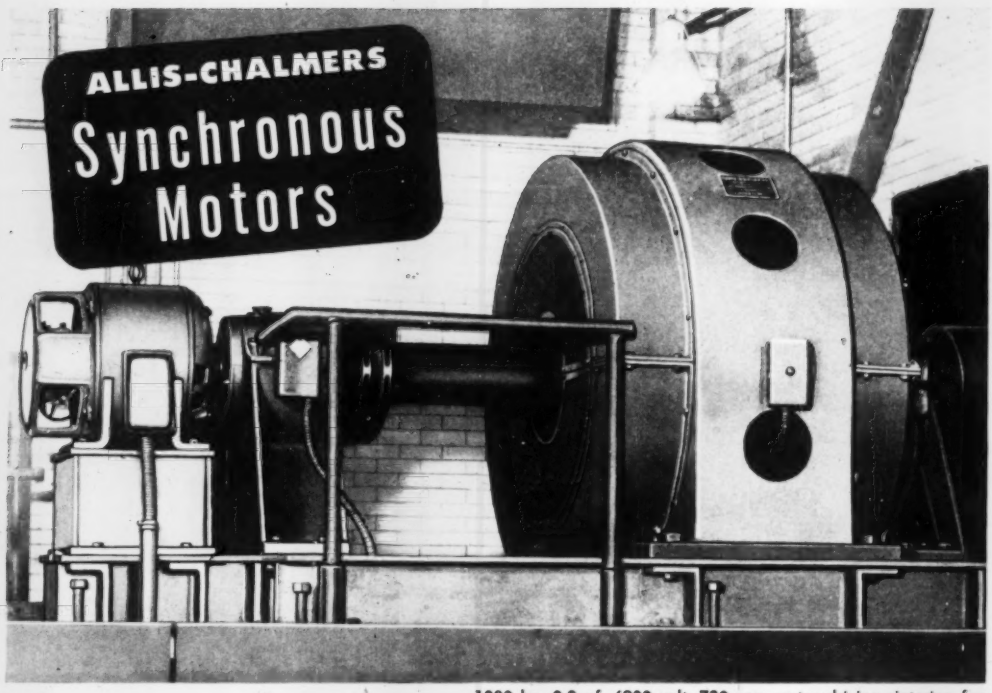




Standardization of full size range is envisaged in joint Army-Navy program; standby facilities are spotted—p. 72

Product Development: Brush-Up on Business, p. 54

Nimble Fingers for 'Iron Hands,' p. 84



1000 hp, 0.8 pf, 6900 volt, 720 rpm motor driving sintering fan

Chosen for TORQUE, POWER FACTOR AND EFFICIENCY

When United States Steel Company needed a sintering fan drive for their Gary Steel Works sintering plant, they chose the Allis-Chalmers motor shown above. A synchronous motor was selected for this application for three reasons:

1. *Pull-out torque* of synchronous motor varies directly with applied voltage, while breakdown torque of cage motor varies as square of voltage. Thus, synchronous motor can stand greater voltage drop without pulling out of step.
2. *Plant power factor* can be improved, with consequent reduction in power costs and increase in overall plant efficiency. Fan and other steady load centrifugal drives are ideal for power factor correction purposes.
3. *Efficiencies* of synchronous motors are higher than those of cage motors.

When you add drives or repower old ones, it's wise to consider these advantages. Judicious use of synchronous motors pays off in dollars and cents.

Pioneering Applications

It's good logic to turn to Allis-Chalmers for assistance with your application problems. A-C engineers pioneered the use of synchronous motors for main rolls and piercing and expanding mills in the steel industry, and for many other applications with unusual torque problems. This wide background of experience can give you motors engineered to fit your requirements.

Helpful Information

Get in touch with your nearby Allis-Chalmers representative, or write Allis-Chalmers, Milwaukee 1, Wisconsin. New bulletins, 05B7648 and 05B7649, describe low and high speed pedestal bearing motors in ratings approximately one hp per rpm and above. Bracket bearing motors are covered by bulletin 05B6112. Bulletin 05B7465 explains power factor correction calculations.

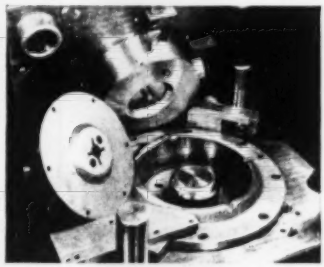
A-3400

ALLIS-CHALMERS AC

Tool Steel Topics

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

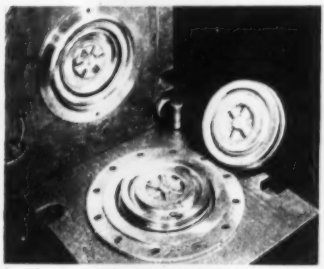


A-H5 tool steel is the backbone of this die which forms the flywheel element of a Borg-Warner automatic transmission from .1495-in. steel sheet in a 1000-ton press. This die must hold accurate size during hardening because it produces precision parts.

Precision dies of A-H5 for Borg-Warner transmissions

Talk to the production men at McIntosh Stamping Co., in Detroit. Ask them how they like the A-H5 tool steel they're using in many of their precision dies. They'll tell you it's doing a good job. It's highly resistant to distortion during heat-treatment. It wears well on long runs, has durable cutting edges, and takes a lot of shock in heavy-duty stamping presses.

A-H5 is our 5 pct chromium air-hardening grade that comes close to the high-carbon, high-chromium grades in its safe, accurate hardening properties. Yet it's as economical as most oil-hardening grades. Easy to machine and heat-treat, too. It's being used more all the time by tool and die makers who want a general-purpose grade, one that's a consistently fine performer and needs no pampering.



A-H5 tool steel adds wear and shock-resistance to this high-production die, hardened to Rockwell C-58, which forms the back plate for a direct-drive clutch from .2092 in. steel sheet in a 250-ton press.

Photos courtesy of McIntosh Stamping Co., Detroit. Parts used in torque converter made by Long Mfg. Co., a division of Borg-Warner Corp.

Customer in Jam, Distributor Flies Tool Steel to Him in Own Plane

The phone rang the other day at the home of one of our distributors while he was at breakfast. It was one of his New England customers in a city several hours distant by car.

"I'm in real trouble," moaned the customer. "I need some tool steel in the worst way. And I've got to have somebody to show us how to heat-treat it. Every hour is costing me plenty!"

Our distributor jotted down the details and grabbed his hat. He rushed over to his warehouse, had the short bars cut to exact length, and loaded them in his car. Then he headed for the airport. Here was his chance to cash in on his week-end flying lessons!

At the airport they had a red monoplane ready, engine warmed up and rarin' to go. In a matter of minutes he was taxiing down the field and off he roared into the wild blue yonder. And in less than two hours after the phone call he was delivering the tool steel and giving the grateful customer some pointers on how to heat-treat it for best results.

Not every Bethlehem distributor can personally fly tool steel to you to meet an emergency. But when you need fast delivery, your Bethlehem distributor is ready to rush your order for popular grades and sizes of carbon tool steel, oil- and air-hardening grades, shock-resisting, hot-work, and high-speed steels. He carries tool bits, brake die steel and other specialties that you need frequently. And he knows that he can call on the Bethlehem tool steel metallurgists to solve unusual problems and to handle special orders with our mill and laboratories.

They're mighty capable folks to depend on for tool steel service, whether it's an emergency, a tough problem, or a routine requirement. That's why we say: "Hats off to the Bethlehem Distributors! They're doing a real job!"

Our Tool Steel Engineer Says: *Decarburized surfaces cause premature tool failures*

Most toolmakers know that decarburized metal must be removed completely from the working surfaces of tools. But it is not so widely known that it's often best to remove this skin from other portions of the tool.

This precaution is especially necessary on tools subject to repeated impacts. For example, a pneumatic chisel having a forged shank often breaks because of a fatigue failure. Usually there is a stress concentration in the shank, due to the change in section; and when this tool surface is also decarburized, rapid failure in service can occur.

The outer layers of a decarburized tool just don't have the strength of the effectively hardened tool steel base. The only safe thing to do is grind off the "decarb" on *all* tool surfaces.

Bethlehem ULTRASONIC TESTED **Tool Steel**

THE ANSWER IS PHILGAS*

Phillips 66 LP-Gas (Philgas) successfully meets many different requirements. There's no cleaner gas! It's free from trouble-making tars, resins, and dust.

Phillips high standards of production and rigid quality controls assure dependability, constant pressures and exceptionally high thermal value. Philgas is shipped as a liquid and burned as a gas, at any desired pressure, high or low.

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Only with B. F. Goodrich grommet belts can you make these savings!

Save 3 ways! Investigate today! Write or mail coupon

You save belt costs because belts last longer, save production costs because machines keep running with fewer interruptions, save maintenance costs because they need less attention.

Patented grommet belts by B. F. Goodrich represent the only basic change since invention of the V belt. Belts last 20 to 50 per cent longer, depending on service. (The more severe the service, the greater the increase over ordinary belts.) Grommet belts have more rubber; they're more flexible, give better grip, less slip.

What is a grommet?

A grommet is like a giant cable except that it's *endless*—a cord loop built up by winding heavy cord on itself. There is no overlapping cord *section* as in all ordinary belts. Most belt failures occur in these sections where cords overlap!

All cords put to work

Each of the two grommets and every part of a grommet carry their share of the load. In ordinary belts under high tension the center cords "dish" because tension is greater near the driving faces. Dished cords are doing less work, not pulling their share. Grommet belts have no center cords, there is no dishing—therefore much more strength in proportion to cord volume—and less stretch. Grommet belts stretch, on an average, only about one-third as much as ordinary belts.

Better grip, less slip

Grommet belts have more rubber in relation to belt size. Without any stiff overlap, they're more flexible, grip pulleys better. Size for size, grommet belts give ⅓ more gripping power, pull heavier loads with a higher safety factor. Because there is less slip, there is also less surface wear.

Send for proof

Send the coupon for a set of reports telling users' experiences and showing actual installations where grommet belts outlasted all others. Some typical cases:

". . . within a few days ordinary belts had stretched . . . After six months of 24-hour-a-day service BFG grommet belts haven't stretched at all . . ."

"Ordinary belts lasted only 5 or 6 weeks . . . B. F. Goodrich grommet belts are in their sixth month of service . . ."

"Previous belts suffered from shock loads, wore out fast . . . BFG grommet belts have been in service 2 years with no shut-downs . . ."

There are hundreds of cases like these.

They cost no more

BFG grommet belts cost not one cent more than others. The savings they make for you are clear profit. They are made in C, D and E sections. They are patented by B. F. Goodrich. No other V belt is a grommet belt (U. S. Patent No. 2,255,294).

Write, send the coupon or see your B. F. Goodrich distributor. (He will show you his "X-ray" belt that shows the grommet construction clearly.)

Grommet V Belts BY

B.F.Goodrich

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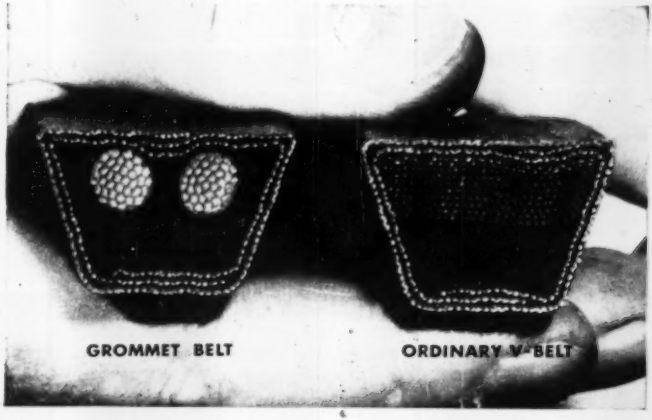

The B. F. Goodrich Company
Dept. S-7
Akron, Ohio

☐ Send set of reports telling users' experiences and showing actual installations proving that B. F. Goodrich grommet belts outlast all others.

☐ Have distributor show me the "X-ray" belt that shows how B. F. Goodrich grommet belts are made.

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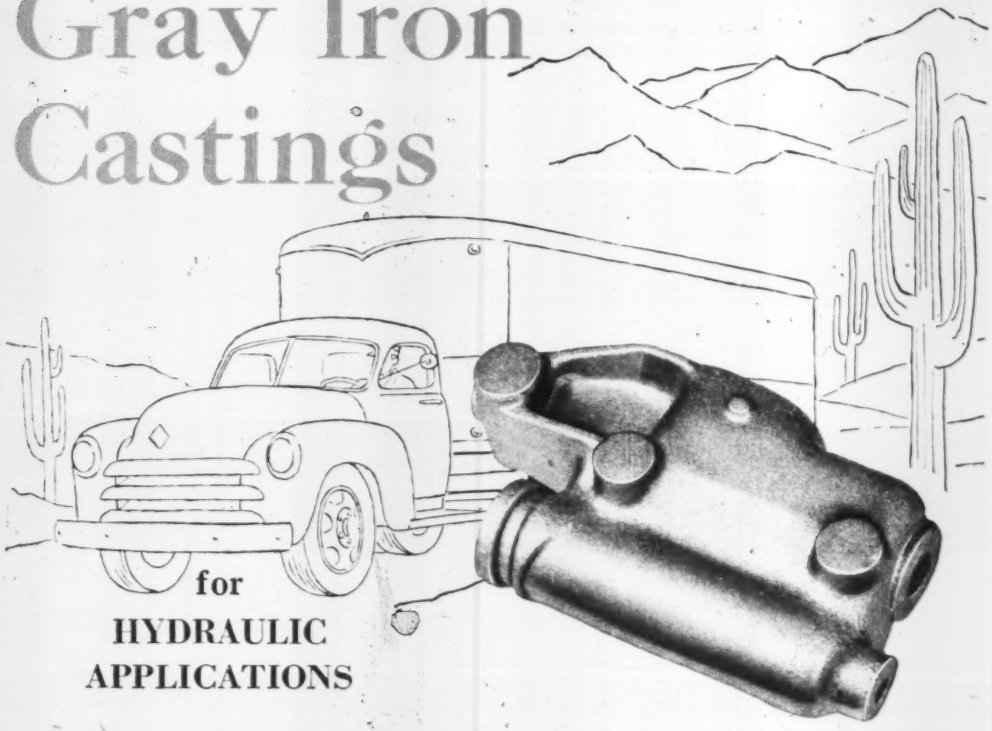

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Send for your copy of the illustrated booklet, "A Quick Picture of the Eaton Permanent Mold Process for Producing Gray Iron Castings."

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STEEL
The Weekly Magazine of Metalworking

VOL. 129 NO. 2 JULY 9, 1951

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Editorial and Business Staff—Page 10. Advertising Index—Page 156. Editorial index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 West 39th St., New York 18.

Next Week **... Military Packaging of Metal Parts ... Quality Control—It Works in Small Plants Too ... Troffer Beams Support Ceiling-Lighting System ... How Design Factors Affect Lining Life of Hot Metal Cars and Mixers**

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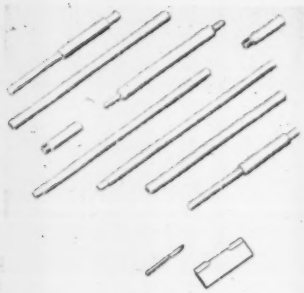

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Behind the Scenes . . .

Theory

Lately we have seen a number of elaborate jokes, cryptic comments and business dictionaries (one of which we ran June 25). Who writes those things? Who has the time to figure them out?

We don't know, but we have a theory. Many of them emanate from Washington sources. We figure that either business men cooling their heels waiting to see some one in the government or federal personnel with a little time on their hands think them up.

All's Calm

You'll be relieved to know that things are pretty stable in the axe, hatchet and hammer industry, according to a report to National Production Authority by an advisory committee from manufacturers of those products.

We have read dozens of reports from similar committees, and this is one which has the fewest complaints — no axes fell, no one got scalped, no particular problems had to be hammered out.

Now We Know

Five of Washington's newly established defense agencies bought 145 executive desks, for $41,000, but only 143 davenports, for $26,500. Here is a clear case of discrimination. Two executives are going to be without a couch.

The five agencies bought 1324 secretaries' desks, for $140,000. All the executives can have nine secretaries apiece, with 19 left over. We suggest that the two officials without davenports get nine extra secrytaries apiece as compensation. That leaves one floating desk and secretary which we suggest be kept in standby condition.

Scrap Scoop

We have the inside story on the kitten that still lived although baled in a half-ton of scrap iron. Both AP and UP carried the item, but not in the detail garnered by Chicago Editor Erle Ross.

Employees of Alter Co.'s West Davenport, Iowa, salvage yard were startled when they heard a distinct "meow" from inside a bale of scrap. The bale had been compressed the day before under pressure of 2000 pounds per square inch. Workers laboring 45 minutes pulled the bale apart and found a two-week-old kitten virtually unhurt. Here is our scoop: The kitten was not killed because it was inside a wire spool, the cylindrical section of which withstood crushing. A second kitten, not mentioned in UP and AP releases, was found dead.

Geometry: The Answer

Now we know why we never became a great creative engineer: Our knowledge and understanding of geometry has always been inadequate. Dr. Ernst F. W. Alexanderson, radio and television pioneer, who has just been awarded his 320th patent for inventions made during his 49 years with General Electric Co., says that "the ability to solve geometry problems should be the first consideration in any intelligence test for engineering." He claims that the solution of geometry problems requires the use of imagination.

Dr. Alexanderson has averaged one patent every seven weeks during his service with GE. He gave the first public demonstration of television projected on a theater screen in Schenectady in 1930.

Puzzle Corner

Each contestant would run 1800 yards in the June 25 problem about the potato race. First in with those correct answers were Ralph Pappenheimer of Specialty Device Co. and Robert W. Huff of Canton, O.

An airplane has a maximum speed in level flight, of 375 mph. and its minimum flying speed is 90 mph. In tests it is flown with full throttle, at various angles of climb; and the speeds corrected for windage are:

Angle of Climb	Speed in mph
0	375
5	370
10	360
15	345
20	325
25	300
30	270
35	235
40	195
45	150
50	100

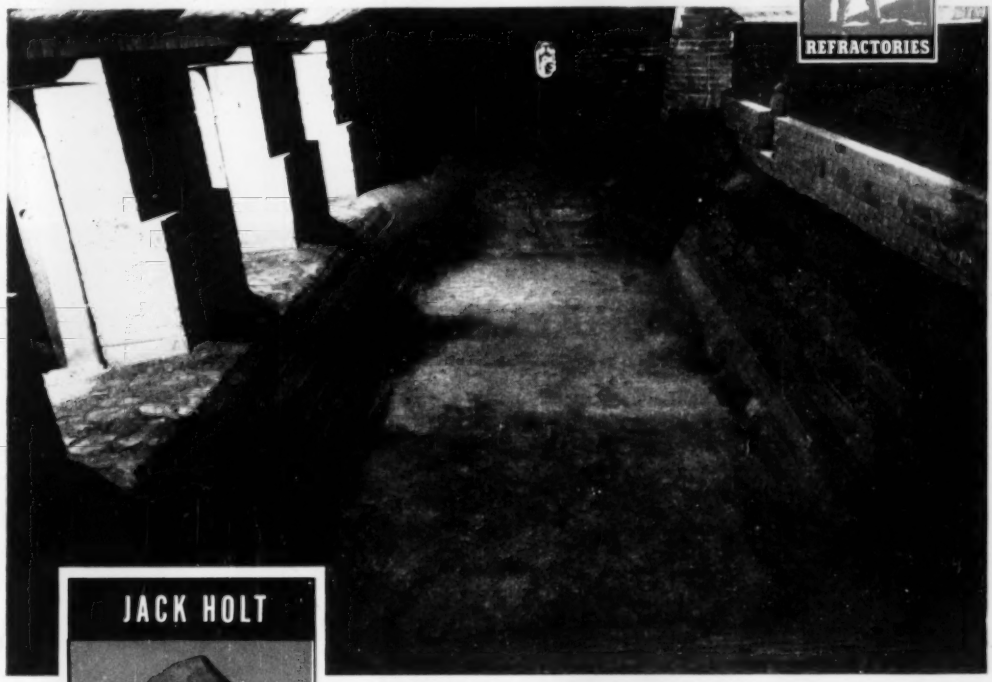
At a greater angle the plane would stall and tend to fall off. From these data find the most efficient angle of climb to gain altitude in the shortest time; and also find that rate of climb in feet per minute.

Shrdlu

(Metalworking Outlook—Page 35)

Basic values behind the trade mark

BASIC FURNACE
REFRACTORIES



After this Ramset hearth — another Basic Service Division job — is brought up to temperature, and slagged, it will be ready for charging.

Jack Holt, member of the Basic Service Division, was open hearth superintendent in an Eastern shop before he joined our staff in 1950.

SERVICE WITH A SALE

A FAMILIAR trade mark identifies a dependable product. But quality of product is only one of the values that stand back of the "man with the shovel."

No product is completely sold unless it is properly serviced . . . We have always believed this. This belief led years ago to our product research program and to the development of installation techniques and tools. More recently it led to the establishment of a Service Division, manned by experienced ex-steelmakers. Incidentally, our Service crew has been booked solidly ever since we announced the new division.

These extra values add nothing to the price of Basic products. They are our contribution, intended to help reduce refractory costs per ton of steel—part of our effort to earn more of your granular basic refractory business.

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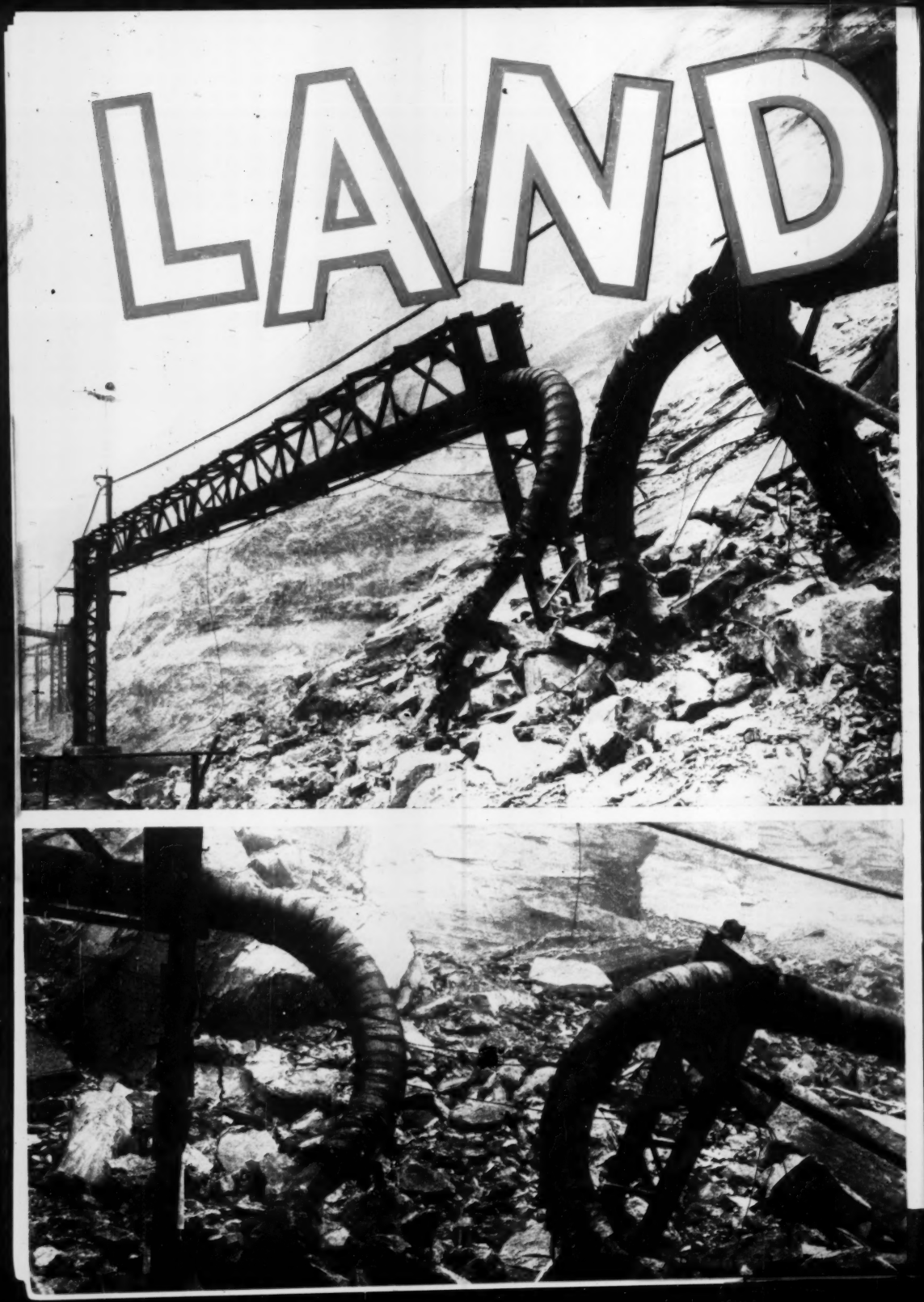
LAND

SLIDE!

but this line did not fail

That landslide dumped hundreds of tons of rock on this steam line of National Seamless Steel Pipe, but service continued *uninterrupted* without a sign of break, or leak, or distress of any kind in the pipe.

That's the beauty of National Seamless. It can "roll with the punches" and come back for more.

Of course you don't buy pipe to wrestle with landslides. But you do buy pipe with the expectation that it will stand up under a lot of punishment in service—if the unexpected should happen. In other words, you want a good margin of safety beyond the line of ordinary duty. Well, that's exactly what made Seamless the wise choice in this particular landslide and in many other similar instances where unexpected stress and strain gave the pipe a real workout to prove its superior strength.

From points all around the country and from various types of service, come reports like this to confirm the wisdom of those who in the past have specified Seamless—Walls Without Welds—America's most widely-used pipe, where reliability is the first consideration.

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PIPE AND TUBING

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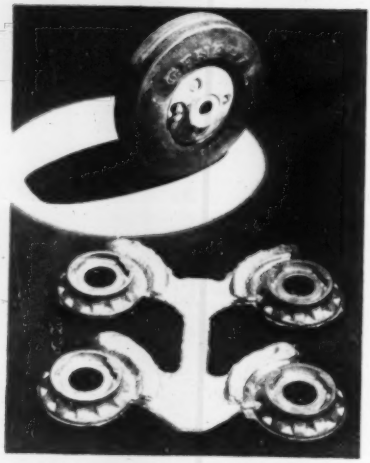
and way less trouble



because it's Well-Cast

This Well Cast magnesium permanent mold wheel casting a ¼ lb. light weight reduces the overall weight of the hand truck on which it's used. Tough as an American in Korea, it's also a push over to machine. Same thing applies to our sand castings in either magnesium or aluminum. Want to lose some weight?

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FOR MAXIMUM SPEED of installation . . . topmost maintenance economy . . . operational ease, safety and efficiency . . . the Federal Noark Bus Duct system is today's best buy.

To begin with, the unique Noark adjustable sliding drop hanger permits the most convenient location of supporting rods and provides the quickest method for installing bus duct that was ever devised. And from then on you get all the advantages brought by Federal Noark Bus Duct special features:

Interlocking Four-Channel Steel Housing . . . welded and screwed together to assure greatest strength. Even the longest runs are bound to be straight and true.

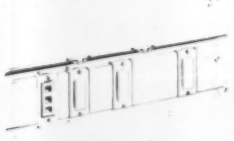
Extra Rugged Interior Construction . . . with the bus bars rigidly held by porcelain insulated receptacles every twelve inches. The bus bars are designed to withstand heavy fault currents.

Positive Contact . . . bus bars are silvered over their entire length. Plug-in stabs reinforced with heavy steel springs.

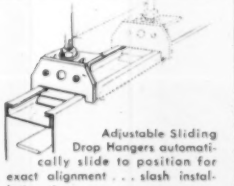
Insulated Plug-In Openings . . . no bus is exposed . . . operator is safe when changing plug-in device. For extra protection, new hook-on bars support plug-in device during installation.

Unsurpassed Heat Dissipation . . . staggering of insulators on alternate sides of duct provides continuous air passage and coolest operation.

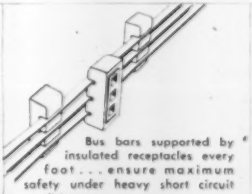
Federal Noark Bus Duct is factory-assembled in 10-foot sections, and completely flexible for future needs. For the full story, write Federal Electric Products Company, 50 Paris Street, Newark 5, New Jersey.



Sliding, self-locking cover plates, protecting insulated plug-in openings, safeguard electricians.



Adjustable Sliding Drop Hangers automatically slide to position for exact alignment . . . slash installation time.



Bus bars supported by insulated receptacles every foot . . . ensure maximum safety under heavy short circuit conditions.

Interlocking four-channel construction assures greatest strength . . . even long runs are straight as a plumb line.

FEDERAL NOARK

Federal

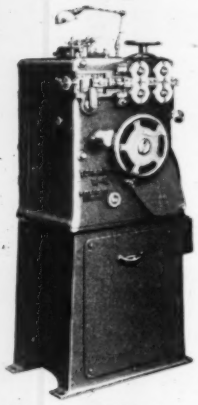
Complete line of Federal Electric Products includes Motor Controls, Safety Switches, Service Equipment, Circuit Breakers, Panelboards, Switchboards, Control Centers, Bus Duct ★ Sales offices in principal cities.

When a good spring will be a love

for your business, see the man with a

Versatile Torrington Spring Coiler

In spring coiling, the words "Torrington" and "Versatile" are synonymous! When you desire springs produced to meet exacting requirements, just call the professional springmaker who has a Torrington coiler. He's the man who can fill your needs with accuracy, speed and economy. On special springs, our sales department will gladly assist you in finding a source of supply, or help your springmaker devise just the right tooling to produce it.



MODEL W-11 SPRING COILER

The 14 different Torrington Spring Coilers cover a range of wire diameters from .005" to .750"

SPECIFICATIONS
of the Model W-11 Spring Coiler

Wire diameter range: .015" to .072"

Wire Length per Spring: 0" to 42" (Extra Wire Feed Gears Available)

Coil Range (O.D.): 3/32" to 1-9/16"

Production: 23 to 190 springs per minute with variable speed drive.

Torsion and other attachments are available.

The TORRINGTON MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT

LETTERS
TO THE EDITORS

Assenting Note

By offering an opportunity for the exchange of ideas and skills, the World Metallurgical Congress, under Dr. Zay Jefferies, director-general (STEEL, June 11, p. 76), can make a significant contribution to the production know-how of the free world.

Charles Sawyer
Secretary of Commerce
Washington 25, D.C.

Dissenting Vote

I take exception to "New Light on Shot Peening" (STEEL, May 14, p. 79). You state there was no relationship between the Almen sample arc height and endurance limit. Results obtained by my two years of fatigue testing of valve springs at Wright Aeronautical Corp. indicated an optimum shot peening intensity for maximum fatigue life on helical springs. This optimum peening intensity will vary with both the size of the spring wire and the surface carbon content.

John A. Bugge
Aircraft Gas Turbine Division
General Electric Co.
Detroit

• *Other engineers also may take exception to some of those findings on shot peening. A major spring company, which conducted the experiments, was the source for our information.*

For Mexican Applications

Please send me the complete description of the pilot plant results, as well as any additional data on the Milton process, as outlined in "Sponge Iron, a Remedy for Scrap Shortage?" (STEEL, June 11, p. 92). We have in Mexico rich iron ores to which we could apply this process successfully.

Francisco Diaz Covarrubias
La Vid No. 103
Colonia Nueva Santa Maria
Mexico 16, D.F.

• *The author of that article, P. E. Cavanagh, Ontario Research Foundation, Toronto, Canada, is sending additional data.*

More About Coolants

What's the name of the Ohio company which claims "a seven-fold increase in cutting tool life between regrinds following introduction of a new type of chemical coolant" as stated in your June 4 issue, p. 87?

H. J. Miesklewicz
Remington Arms Co.
Ilion, N. Y.

• *We have no way of substantiating those claims which we presented as such. Further definite information may be obtained by addressing K. E. Karlson Co., 1836 Euclid Ave., Cleveland.*

"HE'S MAKING ANOTHER FAST DELIVERY OF READING COPPER TUBING!"

For a dependable source of supply . . . specify Reading brass and copper tubing . . . processed from the basic metal to the finished tubing in one of America's finest completely integrated mills.

READING BRASS-COPPER TUBING

READING TUBE CORPORATION

Producers of Reading Lektroneal Copper Tubing and Reading Brass Tubing

OFFICES AND EASTERN DISTRIBUTION DEPOT:
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WORKS: READING, PA. STillwell 6-9200

Stocks Available at ALL Reading Distribution Depots:

- READING, PA. • HOUSTON, TEXAS: 1121 Rothwell St.
- LONG ISLAND CITY, N. Y. • CHICAGO, ILL.: 724 W. 50th St.

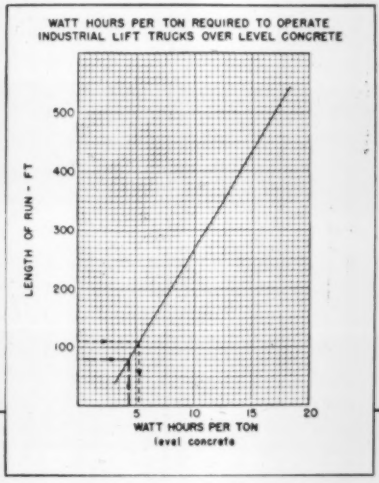
GOULD

Plus-Performance Plan ...TELLS YOU HOW TO

SELECT YOUR BATTERIES TO FIT YOUR JOB!

You can increase battery performance as much as 50% through the help of the GOULD PLUS-PERFORMANCE PLAN! Here is a complete and integrated system of manuals, articles, specifications, bulletins, record cards and charts which explain and illustrate how to select, charge and handle, maintain and determine the condition of your batteries.

Designed to help you conserve and extend your essential battery power, the GOULD PLUS-PERFORMANCE PLAN is FREE to ALL battery users without obligation. A request on your letterhead will bring descriptive literature by return mail.

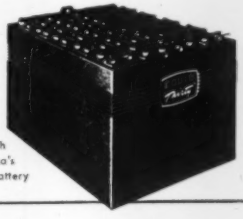


▲ This graph plus easily worked formulas enable you to compute required watt-hours.

AN EXAMPLE OF PLUS-PERFORMANCE PLAN HELPFULNESS

Selection Requires Route Analysis

Battery selection should be made only after careful analysis of the route truck will travel and the load it will handle. Knowing weight of truck empty, amount of average load, average length of run and length and percent of grades encountered, simple, easy formulas enable you to calculate the battery capacity needed for 1) level run loaded; 2) going up grade; 3) return trip empty; 4) lifting; 5) tilting. The sum of these five computations gives total watt hours necessary for trip. Multiplying by trips a day gives total daily watt hours required. Dividing this total by battery voltage required gives minimum battery capacity for the job.

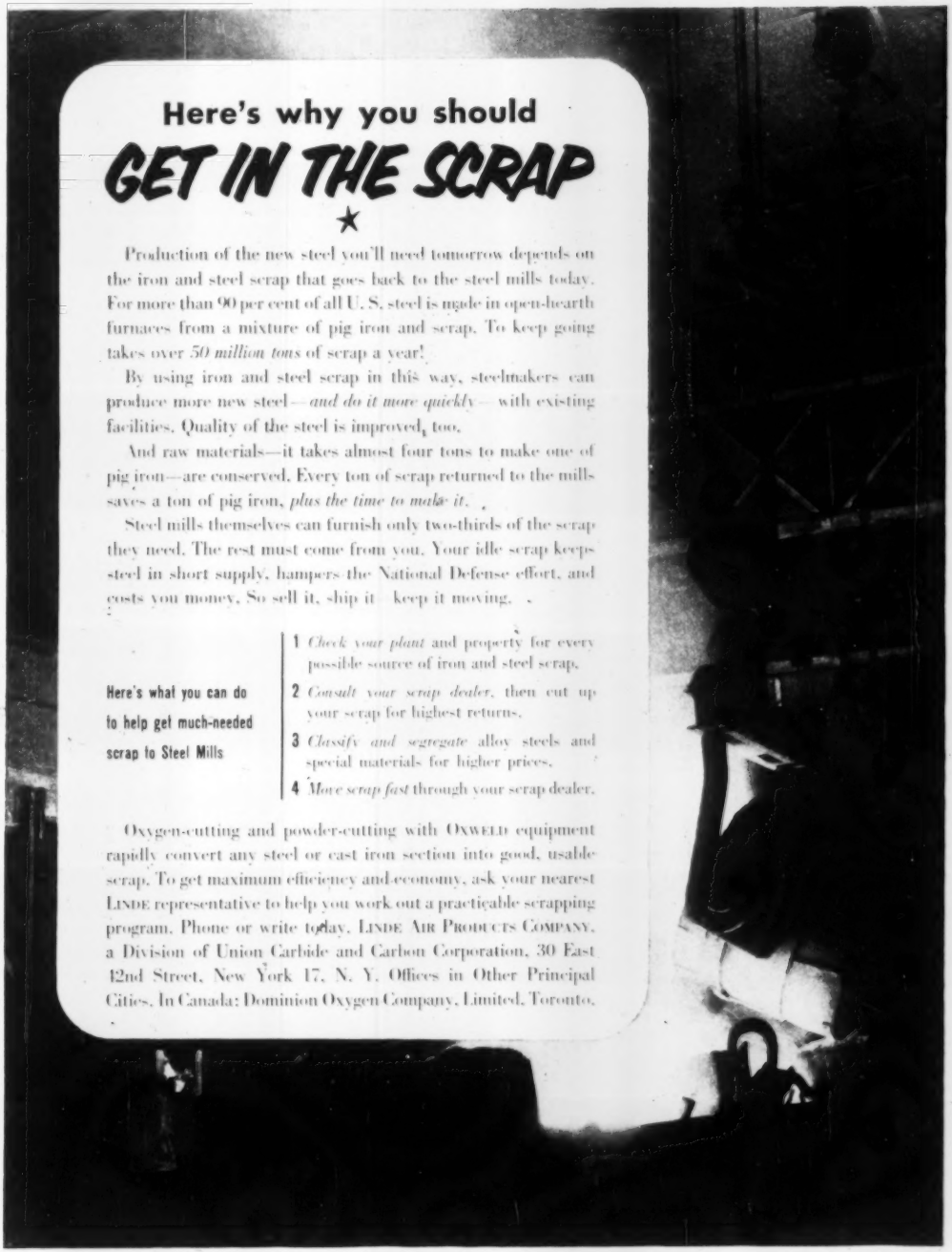


Gould "Thirty" with "Z" plates—America's Finest Industrial Truck Battery

GOULD STORAGE BATTERIES

GOULD-NATIONAL BATTERIES, INC., TRENTON 7, NEW JERSEY

Always Use Gould-National Automobile and Truck Batteries



Here's why you should

GET IN THE SCRAP

★

Production of the new steel you'll need tomorrow depends on the iron and steel scrap that goes back to the steel mills today. For more than 90 per cent of all U. S. steel is made in open-hearth furnaces from a mixture of pig iron and scrap. To keep going takes over *50 million tons* of scrap a year!

By using iron and steel scrap in this way, steelmakers can produce more new steel—*and do it more quickly*—with existing facilities. Quality of the steel is improved, too.

And raw materials—it takes almost four tons to make one of pig iron—are conserved. Every ton of scrap returned to the mills saves a ton of pig iron, *plus the time to make it*.

Steel mills themselves can furnish only two-thirds of the scrap they need. The rest must come from you. Your idle scrap keeps steel in short supply, hampers the National Defense effort, and costs you money. So sell it, ship it—keep it moving.

Here's what you can do to help get much-needed scrap to Steel Mills

1 *Check your plant* and property for every possible source of iron and steel scrap.

2 *Consult your scrap dealer*, then cut up your scrap for highest returns.

3 *Classify and segregate* alloy steels and special materials for higher prices.

4 *Move scrap fast* through your scrap dealer.

Oxygen-cutting and powder-cutting with OXWELD equipment rapidly convert any steel or cast iron section into good, usable scrap. To get maximum efficiency and economy, ask your nearest LINDE representative to help you work out a practicable scrapping program. Phone or write today. LINDE AIR PRODUCTS COMPANY, a Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. Offices in Other Principal Cities. In Canada: Dominion Oxygen Company, Limited, Toronto.

Linde
Trade-Mark

Products and Processes for MAKING, CUTTING, JOINING, TREATING, AND FORMING METALS

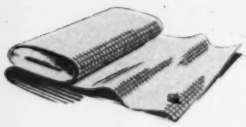
The terms "Linde" and "Oxweld" are registered trade-marks of Union Carbide and Carbon Corporation.

What Part Does
MURIATIC ACID
Play in Your Production Program?

For Metal Pickling

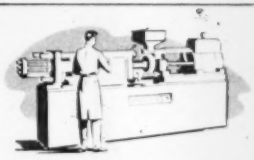
For Oil Well Acidizing

For Chrome Tanning of Leather



In the Textile Industry

In the Manufacture of Pharmaceuticals



In the Manufacture of Vinyl Chloride

Of all industrial acids, Muriatic (Hydrochloric) Acid is second only to Sulfuric in versatility and volume used. Today, the demand for it has spiraled to new heights to meet accelerated production requirements in many of our most essential industries.

As a primary producer for over 50 years, General Chemical offers this important basic chemical in all grades and strengths from Standard to C. P. (Reagent) quality . . . from tank car to small bottle lots. The Standard grade is produced in 18°, 20° and 22° Baume strengths; Diamond and Crystal grades —20° Baume, and Reagent, Sp. Gr. 1.18.

Why not review your needs with our nearest office?

BASIC CHEMICALS

FOR AMERICAN INDUSTRY

GENERAL CHEMICAL DIVISION

ALLIED CHEMICAL & DYE CORPORATION

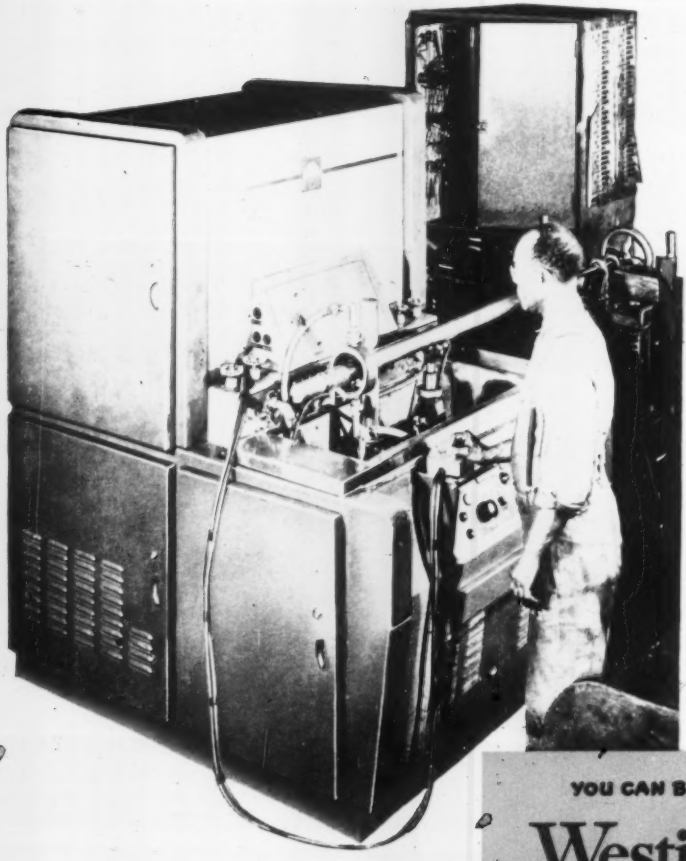
40 Rector Street, New York 6, N. Y.

Offices: Albany • Atlanta • Baltimore • Birmingham • Boston • Bridgeport • Buffalo Charlotte • Chicago • Cleveland • Denver • Detroit • Greenville (Miss.) • Houston Jacksonville • Kalamazoo • Los Angeles • Minneapolis • New York • Philadelphia Pittsburgh • Providence • St. Louis • San Francisco • Seattle • Yakima (Wash.) In Wisconsin: General Chemical Company, Inc., Milwaukee, Wis.

In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver

RF INDUCTION HEATING...

Now even better than before



SURE – Miehle Printing Press and Manufacturing Company has been using induction heating on about 100 parts for years. They therefore know that for control, for quality, for savings in labor, floor space, and other costs (and for production increases) induction heating can't be beat.

AND – With this experience in mind, Miehle asked about new RF equipment to replace their old induction heating set-up.

THEN – Miehle purchased a Westinghouse 20 KW-450 KC RF Generator. It's used for brazing, hardening and annealing of printing press parts in job-lots. RESULTS: Production up more than 20%, costs cut accordingly (over the former equipment which had already shown clear gains over other methods!).

You, too, can save space, time, and money with Westinghouse RF heating equipment. Write today to Westinghouse Electric Corporation, 2519 Wilkens Avenue, Baltimore 3, Maryland. Outline your specific needs.

J-02227

YOU CAN BE SURE...IF IT'S

Westinghouse

INDUCTION HEATING

Bright chapter in the West's growth

A NEW MILL to produce tinplate—critically needed by western can manufacturers—is now under construction by Kaiser Steel.

Scheduled for completion next year, it will add 200,000 tons of tinplate to the West's annual supply—enough for 2 billion cans a year.

This tinplate mill will help greatly to meet the urgent needs of the West's multi-million dollar produce industry. It will provide sorely needed metal to protect military provisions.

This is another chapter in a *continuous* story of expansion by Kaiser Steel . . . resulting in greater production of finished steels listed below. Today, this steel is helping in countless ways to supply military and essential civilian requirements.

More evidence that the West Coast's only integrated, *independent* steel plant is helping to build a stronger West . . . and a stronger nation!

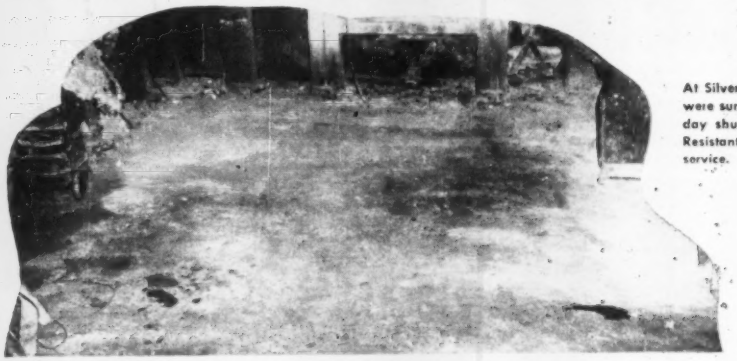
It's good business to do business with

Kaiser Steel

built to serve the West

PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • hot rolled strip • hot rolled sheet • alloy bars carbon bars • structural shapes • cold rolled strip • cold rolled sheet • special bar sections • semi-finished steels • pig iron • coke oven by-products
For details and specifications, write: **KAISER STEEL CORPORATION, LOS ANGELES, OAKLAND, SEATTLE, PORTLAND, HOUSTON, TULSA, NEW YORK**

For *FAST* Foundry Floors use Lumnite* Heat-Resistant Concrete



At Silverstein & Pinsof, Inc., Chicago, workers were surprised when they returned after a one-day shutdown and found this Lumnite Heat-Resistant Concrete floor in place, ready for service.

TALK ABOUT SPEED! This tough Heat-Resistant Concrete floor was poured during a *one-day* shutdown. In service the very next day, it has taken the soaking heat of melting furnaces and the pounding of scrap boxes for 3½ years—and it's still going strong.

A RECORD? Far from it. You can *expect* speed with any Lumnite Concrete. It reaches service strength in 24 hours or less . . . cuts outage time on both Heat-Resistant and Refractory jobs. You can count on durability, because Lumnite Concrete withstands severe thermal shock. With suitable aggregates, it takes heat to 2600° F. And it's easily and economically poured in the shape and size needed.

Why not check now to see where you can speed construction and cut costs with Lumnite calcium-aluminate cement? It can be used for Heat-Resistant, Refractory or Insulating Concrete, depending on the aggregate. Lumnite has an enviable record of service and economy on such tough jobs as furnace car tops, door linings, arches and base pads, stack linings, and slow-cooling pits.

FOR CONVENIENCE, you may prefer to buy prepared Castable mixes. These packaged mixtures of Lumnite and selected aggregates are tailor-made to meet your specific temperature and *insulation* requirements. Add only water. They are made by refractory manufacturers and sold through their dealers.

For more information write: Lumnite Division, Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

Constant pounding force of red-hot skulls being dumped hasn't hurt this Lumnite Concrete floor at Silverstein & Pinsof. Reports say floor is in good condition after 2½ years.

Lumnite Heat-Resistant Concrete worked so well for furnace room and slag dump floors that Silverstein & Pinsof is using Refractory Concrete to reline doors of melting furnaces.

*"LUMNITE" is the registered trade mark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company.

S L SI

ATLAS® **LUMNITE for INDUSTRIAL CONCRETES**

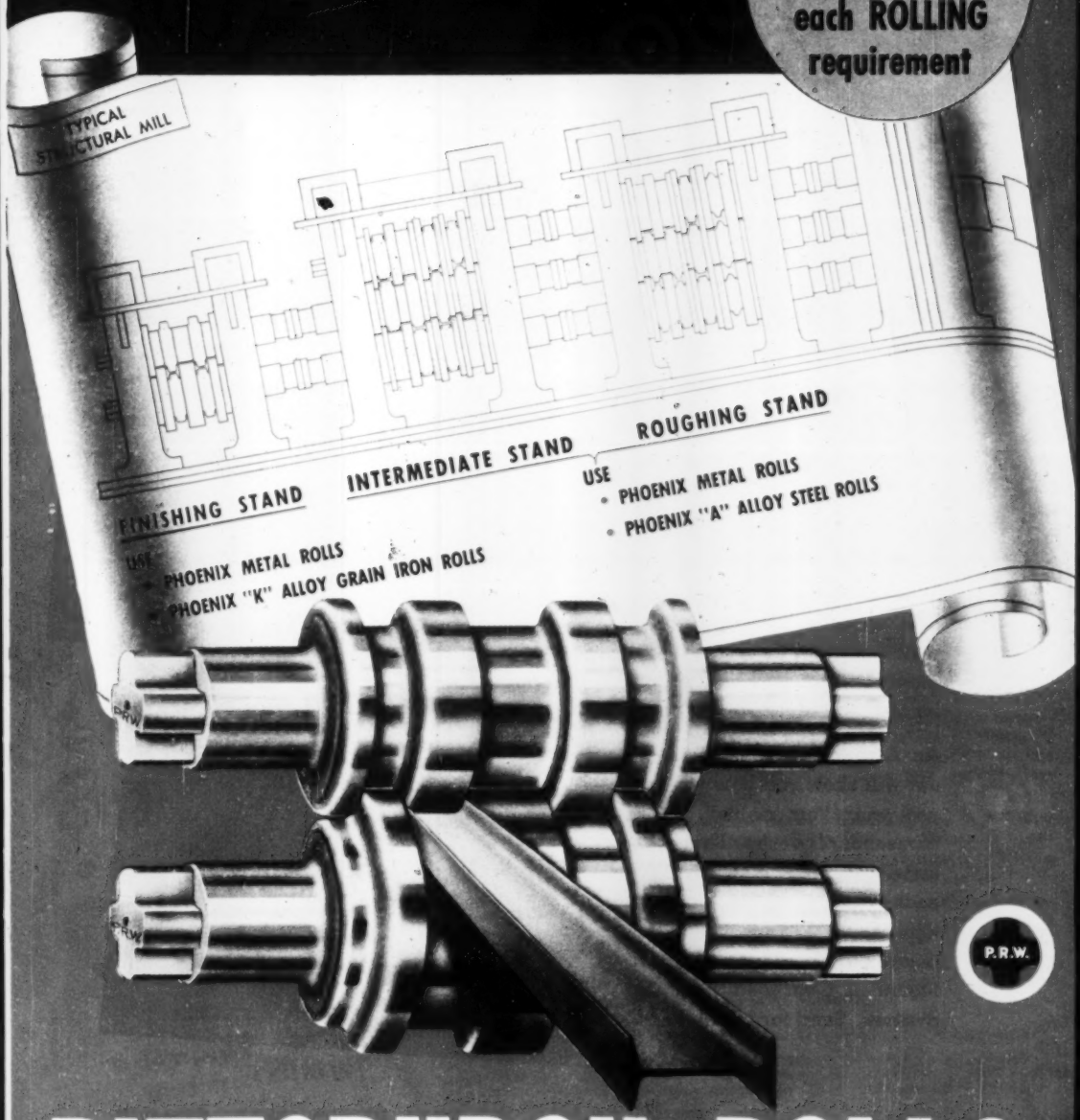
REFRACTORY, INSULATING, OVERNIGHT, CORROSION-RESISTANT

A UNIVERSAL ATLAS PRODUCT

NBC SYMPHONY SUMMER CONCERTS—*Sponsored by U. S. Steel Subsidiaries—Sunday Evenings—June to September*

ROLLS for ROLLING BEAMS

There's a definite PHOENIX ROLL for each ROLLING requirement



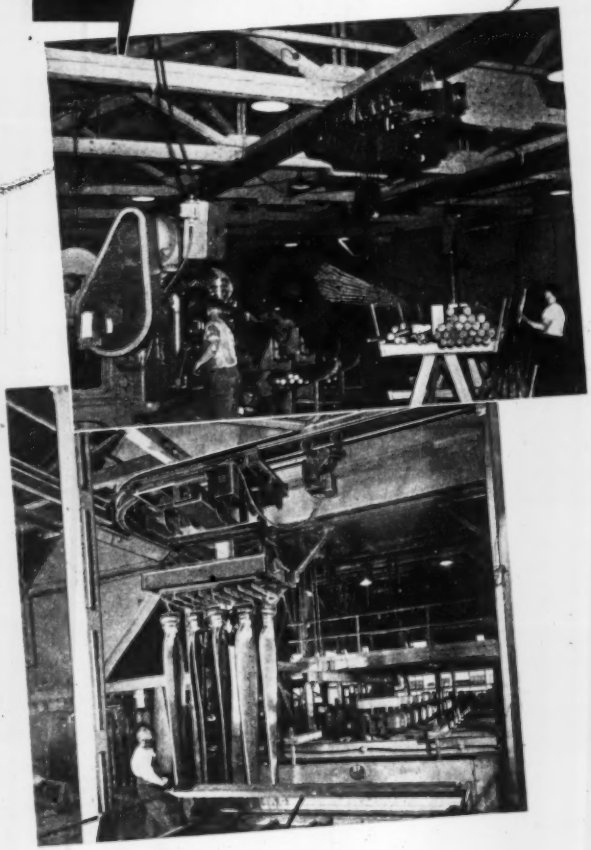
PITTSBURGH ROLLS

PITTSBURGH ROLLS DIVISION OF BLAW-KNOX COMPANY • PITTSBURGH, PA.

INCREASE PRODUCTION NOW...

WITH Present Plant Manpower

Present Plant Space



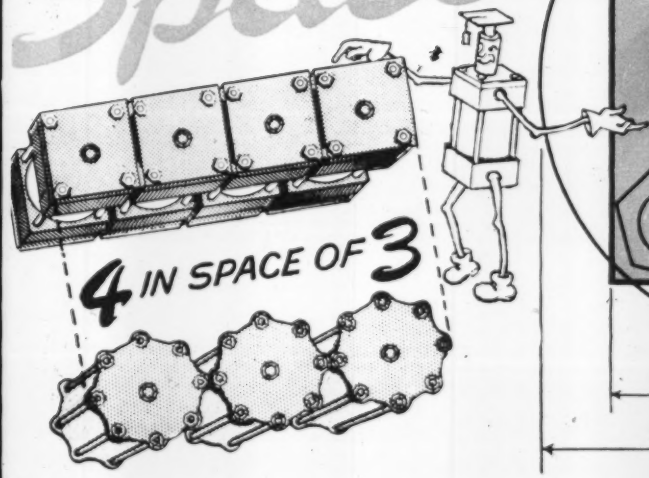
The next time you walk through your plant, cast your eyes toward the ceiling and you'll realize that there is mighty valuable space that can be put to work—without increasing your plant capacities and without increasing plant manpower.

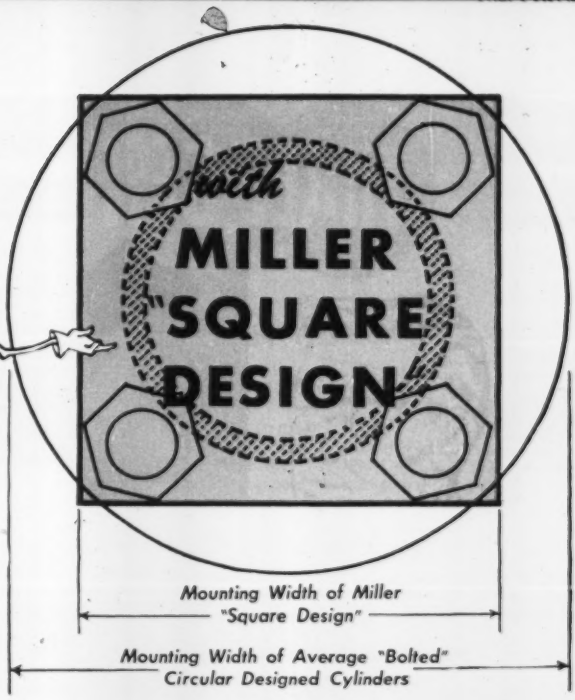
An American MonoRail engineer will show you how you can use your "air rights". With thousands of overhead handling installations from which to draw, each with many money and time saving advantages, it will pay you to investigate American MonoRail Overhead Handling Systems. Send for bulletin C-1.

THE AMERICAN MONORAIL COMPANY

13102 ATHENS AVENUE CLEVELAND 7, OHIO

Save Space





Miller

Benefits to You!

- More Cylinder Power in Same space
- Solve "Limited Space" Problems
- Simplify Designing and Installation
- Save hours of Drafting Time

Air *and* Hydraulic CYLINDERS...

The SQUARE DESIGN of Miller Cylinders saves up to 25% of mounting space, permitting more cylinder power in the same space and easier, more convenient installation in "tight spots." Thus, in many cases, machines and equipment can be designed more compact and less costly by using Miller Cylinders. Hours of drafting time can be saved — as only a few straight lines show any view on drawings.

The illustration at upper left shows graphically how *four* Miller Cylinders can be mounted, bore for bore, in the same space required for *three* average "bolted" circular designed cylinders. Some Miller bore sizes permit even greater space-savings.

Other important *standard* features of all Miller Cylinders include: solid steel heads, caps and mountings, hard chrome plated piston rods, dirt wiper seals, and other "quality" features as shown in illustrated bulletins sent FREE on request. Remember, too, that Miller Hydraulic Cylinders (2000-3000 psi) meet the J. I. C. Hydraulic Standards.

Write for illustrated cylinder bulletins A-105 and H-104

COMPLETE MILLER CYLINDER LINE INCLUDES: AIR CYLINDERS, 1½" to 20" BORES, 200 PSI OPERATION; LOW PRESSURE HYDRAULIC CYLINDERS, 1½" TO 6" BORES FOR 500 PSI OPERATION; 8" TO 14" BORES FOR 250 PSI; HIGH PRESSURE HYDRAULIC CYLINDERS, 1½" TO 12" BORES 2000-3000 PSI OPERATION. ALL MOUNTING STYLES AVAILABLE.

Miller

MILLER MOTOR COMPANY

2032 N. HAWTHORNE, MELROSE PARK, ILL.

AIR AND HYDRAULIC CYLINDERS · ACCUMULATORS · COUNTERBALANCE CYLINDERS · BOOSTERS · AIR HOISTS

CLEVELAND — PITTSBURGH — PHILADELPHIA — DETROIT — YOUNGSTOWN — BOSTON — HARTFORD — NEW YORK CITY — DAYTON — ST. PAUL — FORT WAYNE — INDIANAPOLIS — MILWAUKEE — NASHVILLE — SEATTLE — LOS ANGELES — SAN FRANCISCO — BALTIMORE — ST. LOUIS and OTHER AREAS.

Sales and Service from coast to coast

THREE CENTS!

That's all it costs to hire this practical foundry specialist!

● A three-cent stamp—that's all it takes to get the years of practical experience and extensive technical knowledge of the Republic Pig Iron Metallurgist, the man who is paid by Republic to work for you, the pig iron user.

If it's a particular production problem on which you need prompt assistance, you can depend on help in a hurry from the Republic Pig Iron Metallurgist. Or if it's a less urgent matter—even a routine survey of the molding practices which you are using—you can count on him to pay you a visit the next time he's in your neighborhood.

The cost? Outside of your original three-cent stamp, not one penny! The only obligation is his—and it is to help you. Drop us a line today . . . let us know when you would like him to call.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Dept.: Chrysler Building, New York 17, New York

Republic PIG IRON

"CHATEAUGAY" Low-Phosphorus, Copper-Free

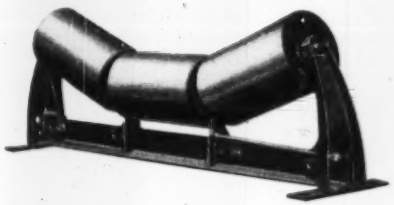
"REPUBLIC" (Northern) Foundry, Basic and Malleable

"PIONEER" (Southern) Foundry and Basic

REPUBLIC STEEL

2 ways L-B Belt Conveyors
cost you less in the long run

1 LINK-BELT Idlers require minimum lubrication and adjustment



BY MINIMIZING maintenance . . . holding "down-time" to a new low . . . reducing power requirements — Link-Belt Roller Bearing Idlers save you money.

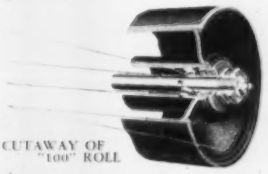
And, because of standardized design, Link-Belt gives you the famous "100" Idler or the heavy-duty "200" Idler at a cost lower than you'd expect. You can choose from the full Link-Belt line of troughing, impact-cushioning, belt training and flat belt idlers in a wide range of roll diameters and belt widths. A complete line to meet any requirement.

Grease-in, dirt-out, cartridge type unit seal preserves lubricant. No springs, no loose parts, no sliding metal-to-metal contact.

Large grease reservoir prolongs lubrication intervals.

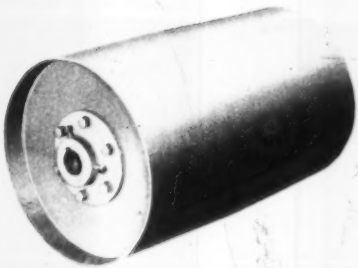
Precision roller bearings maintain alignment.

Concentrically counterbored and journaled full-length central tube and counterbored roll shell are continuously welded to dished heads to maintain balance and bearing alignment.



CUTAWAY OF "100" ROLL

2 LINK-BELT Welded Steel Pulleys minimize shaft deflection



MODERN Link-Belt welded steel design gives you lower maintenance and longer pulley life in more ways than one. Water- and dust-tight construction preserves balance, halts corrosion. Removable hubs — key-seated in line with two set-screws — are interchangeable with many other shaft sizes.

And for reducing shaft deflection (see below), you can't possibly get better protection than with Link-Belt Welded Steel Pulleys.

Since shaft bending moment increases as the square of the distance between shaft bearing and pulley hub, it's easy to see why Link-Belt Welded Steel Pulleys are your best bet. Note how the bearing support and hub of the pulley are mounted with minimum clearance. That's possible because Link-Belt hubs are flush with the pulley face.

BELT CONVEYORS

LINK-BELT

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices, Factory Branch Stores and Distributors in Principal Cities.

AIRCO TRAVOGRAPH—for large-area, production cutting of a wide variety of precision parts. A motor-driven machine that moves along a track, its multiple torches are guided by an electronic tracing device that follows a simple outline or silhouette drawing.

ARE YOU GETTING "Airco Accuracy" WITH EVERY MACHINE GAS CUTTING JOB?

Whatever your steel cutting problem—from squaring and shaping of large plates and heavy slabs to quantity, precision-cutting of small steel parts—there's an Airco Gas Cutting Machine that's just suited to your needs . . . designed to do the work faster, better, at lower operating cost.

Airco Gas Cutting Machines are made in portable and stationary types, for single or multiple torch operation—all embodying characteristic Airco accuracy, rugged construction and excellent operating performance . . . insuring long, trouble-free life under heavy service loads.

Three separate and distinct tracing devices help give the Airco machines their great flexibility and accuracy: manual, magnetic and the fully-automatic "Electronic Bloodhound." With the "Electronic Bloodhound," cuts of the most intricate shapes can be made easily to specified close tolerances.

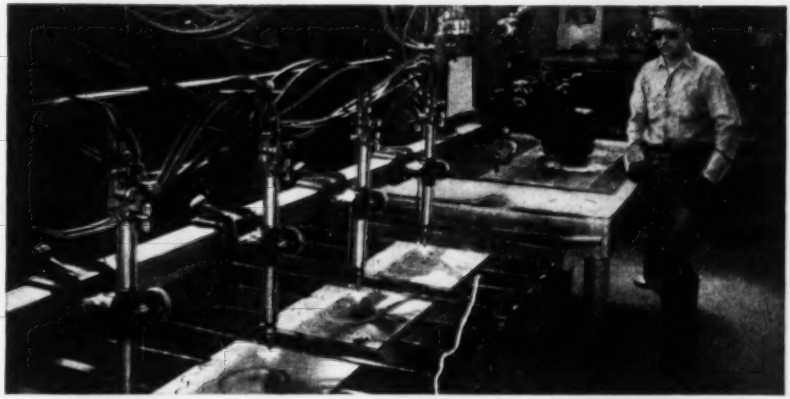
From an 8-torch Travograph, equipped with an electronic tracing device, to the portable No. 3 Monograph, each Airco Gas Cutting Machine performs a wide variety of cutting jobs within its specific operating range . . . an important feature that has made Airco Gas Cutting Machines outstanding in the metal-working industry.

So, for economy, speed, and accuracy, investigate the possibilities of using any one of the numerous Airco Gas Cutting Machines—select the one best suited to your needs. Please write your nearest Airco office for full details.

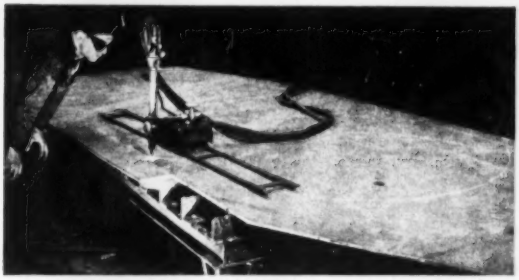
AIRCO **AIR REDUCTION**

AIR REDUCTION SALES COMPANY • AIR REDUCTION MAGNOLIA COMPANY
AIR REDUCTION PACIFIC COMPANY
REPRESENTED INTERNATIONALLY BY AIRCO COMPANY INTERNATIONAL
Divisions of Air Reduction Company, Incorporated
Offices in Principal Cities

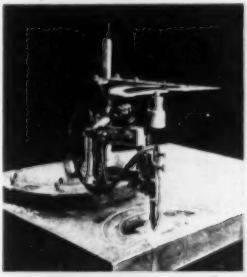
AIR REDUCTION . . . PIONEER



AIRCO OXYGRAPH —one of the most popular stationary shape cutting machines ever offered. Designed for single or multiple torch operation, identical parts of any design are accurately shaped in one operation—either by "stack" cutting or an individual cutting operation.



AIRCO No. 10 RADIAGRAPH—a lightweight, portable, motor-driven machine that is ideal for straight line cutting, squaring, beveling and similar cutting jobs. It cuts arcs and circles up to 85" in dia.



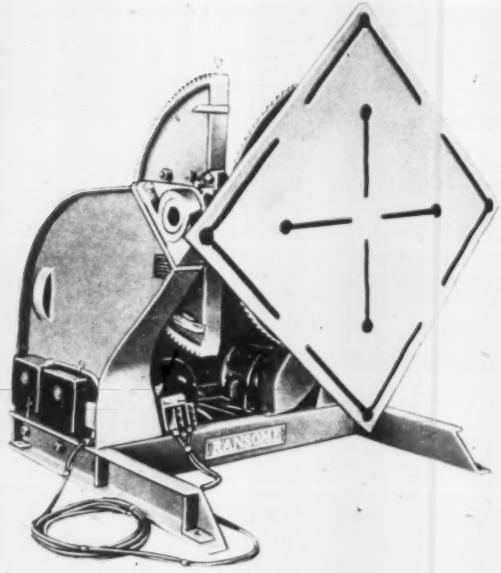
AIRCO No. 5 CAMOGRAPH —ideal for repetitive cutting of small shapes. It cuts parts of any contour by means of a motor-driven magnetic roller that follows the template itself. This controls the torch movement, and assures speedy, accurate cutting.

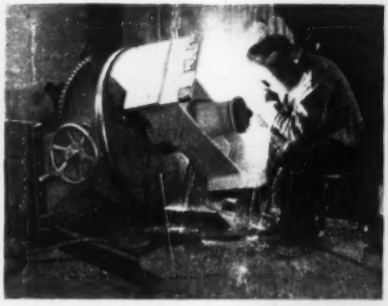
AIRCO No. 1 MONOGRAPH, an inexpensive, portable shape cutting machine. Designed for straight line, circle and bevel cutting jobs in addition to irregular shape cutting—all with a high degree of accuracy. The machine is easily moved from job to job—weighing only 110 lbs.

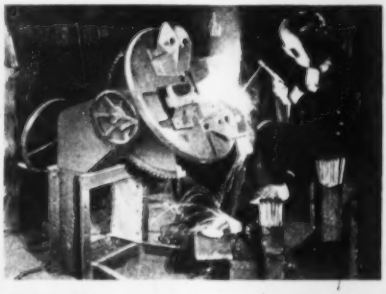
DESIGNERS OF FLAME CUTTING MACHINES FOR EVERY PURPOSE

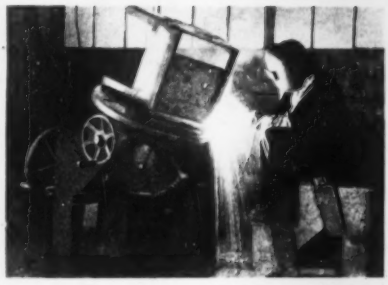
Lots of Different Pieces or Lots Alike...

THIS POSITIONER PAYS OFF









in more production . . . better welds . . . less rod waste

The universal table top makes the Worthington-Ransome Welding Positioner as profitable on *job* work as it is in mass production.

Those "T" slots make the table adaptable to any shape of work piece and a wide range of sizes. No special jigs or fixtures needed.

Result—up to 50% more footage, *better* welds (using higher current and heavier rods), less welding rod waste.

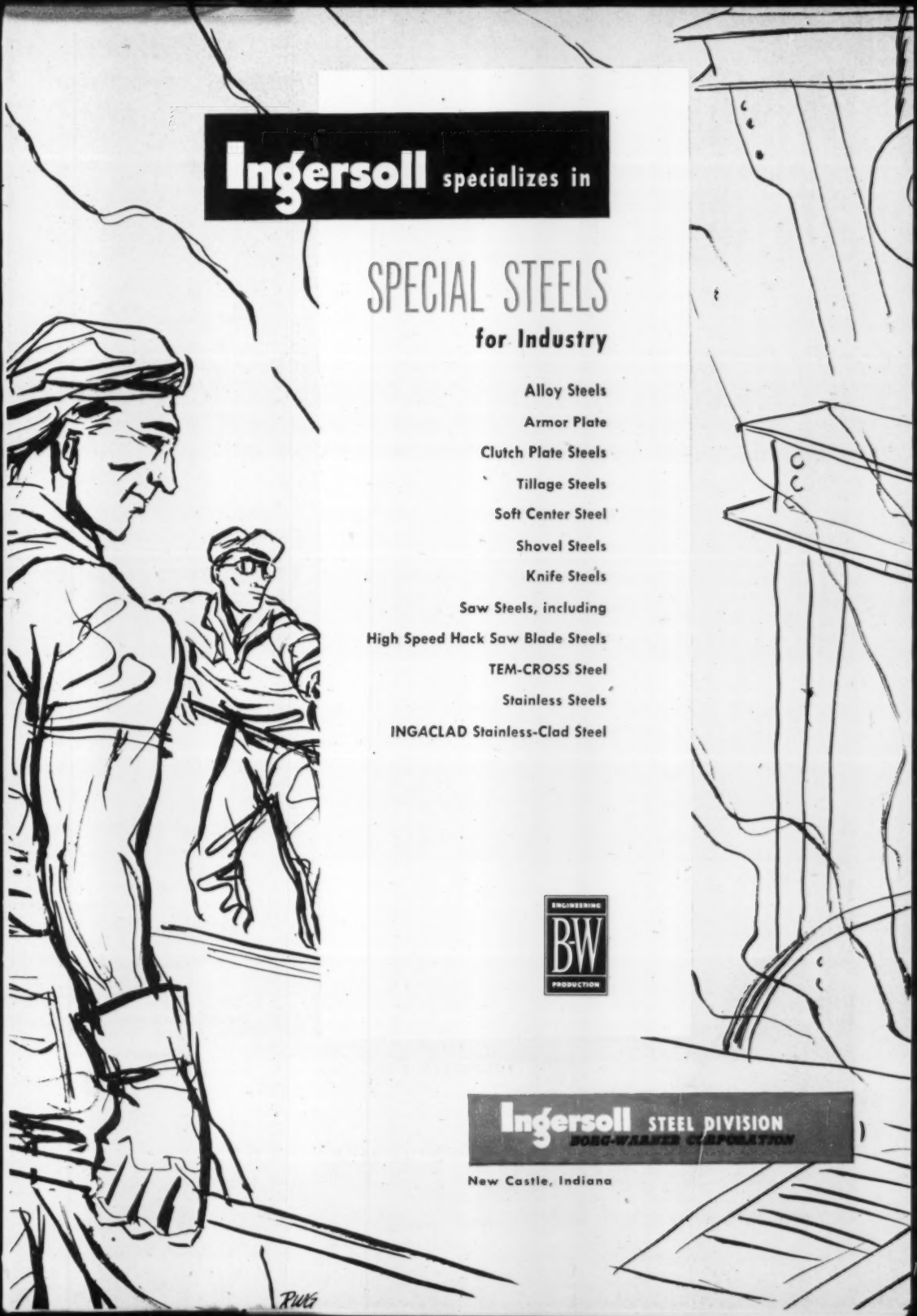
Welding positioner capacities from 100 lb to 30 tons. Also: turning rolls from 3 to 150 tons, stationary or self-propelled.

Write Worthington Pump and Machinery Corporation, Dunellen, New Jersey, for bulletins or additional information.

Y-1.2

WORTHINGTON

50% PRODUCTION UP
LABOR COSTS DOWN
Welding Positioners
Turning Rolls



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SPECIAL STEELS

for Industry

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Saw Steels, including

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INGACLAD Stainless-Clad Steel

ENGINEERING B-W PRODUCTION

Ingersoll STEEL DIVISION
BORG-WARNER CORPORATION

New Castle, Indiana

When the chips are down

...who's your standby?

YOUR industrial distributor*, of course. He is your nearest, quickest, surest source of supply.

Who else offers a concentrated supply of so many manufacturing requisites? Who else is more likely to know where and how to obtain scarce or sorely needed tools, machines, supplies, parts, accessories, etc.? Who else can do more to help you save time, conserve equipment, keep manpower on the go?

These are critical times. You need your industrial distributor more than ever — to make available items you may require sooner or later, but which would tie up a lot of capital to warehouse yourself.

You need him to relieve you of the headaches of having a lot of scattered direct-buying contacts. They can cost you much in time and effort. You need him to expedite purchase orders and deliveries.

Also . . . your industrial distributor has up-to-date information that is often invaluable to hard-pressed production heads — especially in selecting the best tools or equipment for different manufacturing operations.

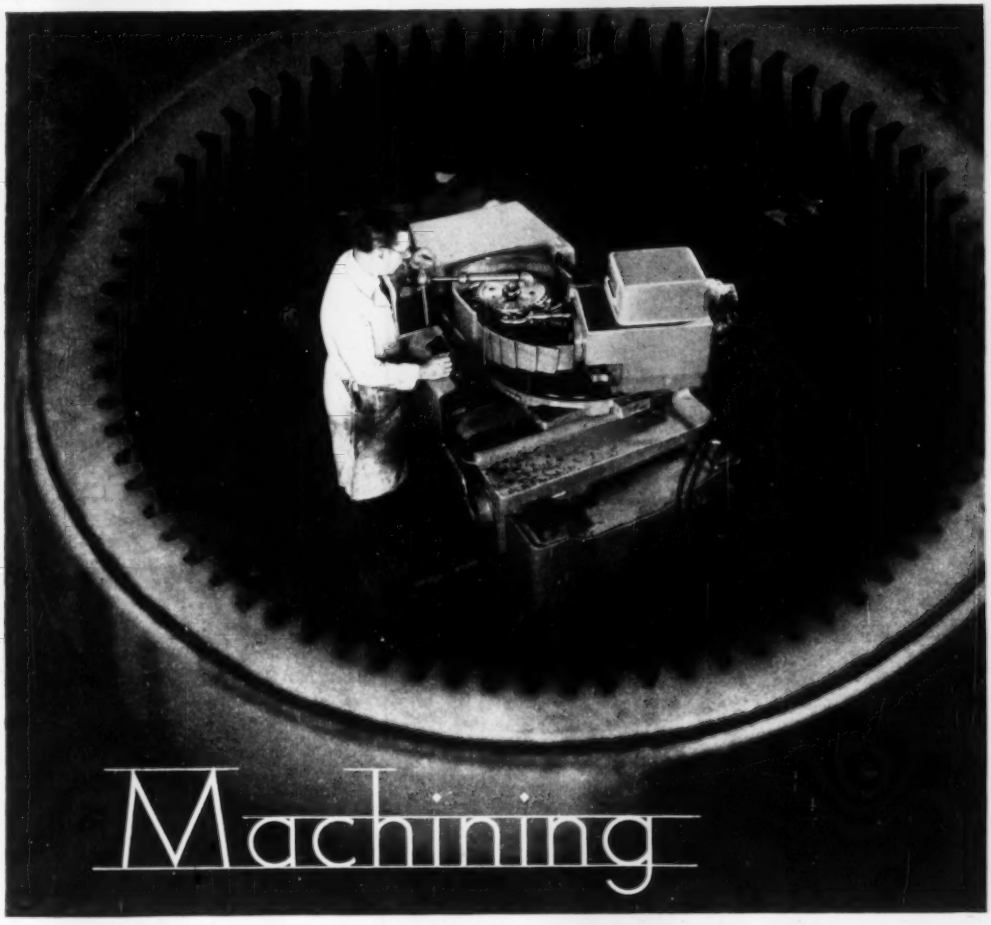
Take files: With a vast assortment of existing regular types, cuts and sizes — and scores of special types for special purposes or materials — your distributor's knowledge of *The right file for the job* is of incalculable assistance on both exacting and mass-production work.

**Marketing through distributors is a policy that has made Nicholson products obtainable and preferred by the largest host of file users under the sun.*

NICHOLSON U.S.A.

NICHOLSON FILE CO. • 71 Acorn St., Providence 1, R. I.
(In Canada, Port Hope, Ont.)

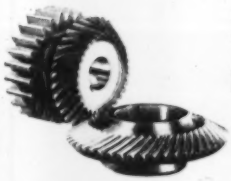
NICHOLSON FILES *FOR EVERY PURPOSE*



of gears is a matter of fitting competent men and efficient machines to the job. One machine may be used to make a variety of gears. But the quality of some types it produces might suffer... or the cost might be higher.

• Here at BRAD FOOTE . . . in our own plant . . . we have an assortment of gear-making machines each of which is used to make gears within certain specifications. This enables us to turn out a volume of gears while positively controlling quality and price. Our highly skilled workers subscribe to and uphold the BRAD FOOTE creed—*"No one shares our responsibility."*

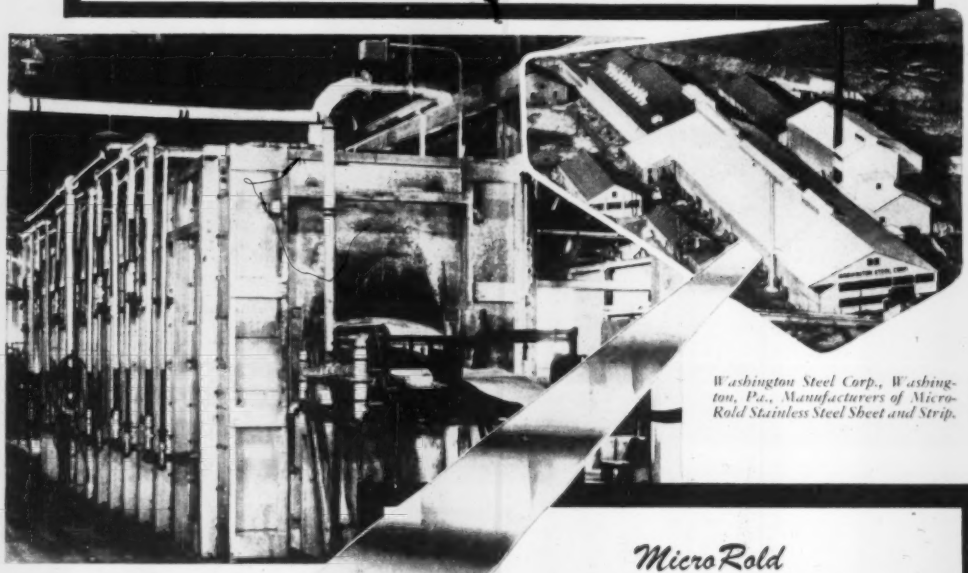
• So when you specify BRAD FOOTE gears—for use in your shop or on the equipment you sell to others—you can be sure of satisfactory performance.



BRAD FOOTE GEAR WORKS, Inc.

BIshop 2-1070 • OLympic 2-7700 • 1309 South Cicero Avenue
Cicero 50, Illinois

CONTINUOUS ANNEALING



Washington Steel Corp., Washington, Pa., Manufacturers of MicroRold Stainless Steel Sheet and Strip.

Continuous annealing furnace utilizing GAS, under automatic control for direct heating of strip.

MicroRold
Stainless Steel Annealing System at
WASHINGTON STEEL CORPORATION
Emphasizes
Simplicity of *GAS* Equipment

MICROROLD* STAINLESS STEEL—in gages from .004" to .078"—requires annealing at one or more stages in the rolling cycle. At Washington Steel Corporation this annealing process is performed in a continuous GAS furnace designed to heat-treat strip just as it comes from the Sendzimer mill.

The method requires accurate temperature control over a wide range, and automatic regulation to compensate for varying furnace loads. Versatile GAS satisfies all of these heat treating requirements in a simple, flexible continuous annealing furnace capable of matching the production of the rolling mill.

The advantages of GAS for continuous annealing of stainless steel strip are manifold. The furnace and controls represent a minimum equipment investment, while fuel economies can be readily determined by direct comparison with other industrial heating methods. The speed with which GAS brings the furnace to annealing temperature, and the precise heat control maintained throughout the process are vitally important in producing uniform MicroRold* stainless strip and sheets.

The experience of Washington Steel Corporation during three years of stainless steel production emphasizes the economy and versatility of GAS for continuous annealing. NOW is the time to examine your own fuel costs with the assistance of your Gas Company Representative.

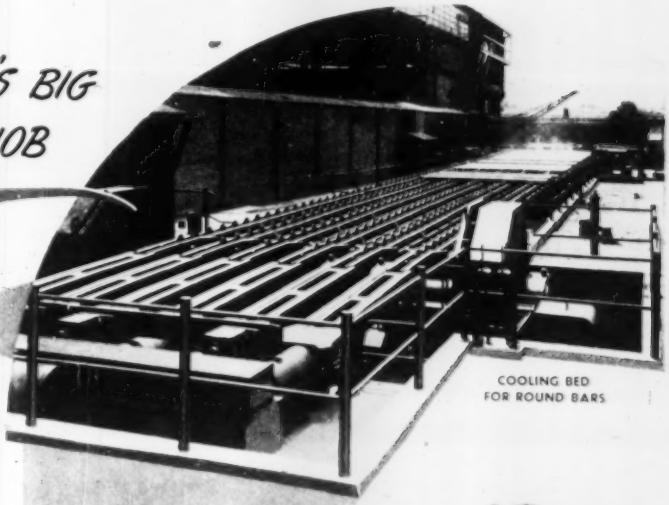
AMERICAN GAS ASSOCIATION
420 LEXINGTON AVENUE, NEW YORK 17, N.Y.

MORE AND MORE... THE TREND IS TO GAS

*MICROROLD is the registered trade mark for stainless sheets and strip manufactured by Washington Steel Corporation.

Y&T F&M makes "what it takes"

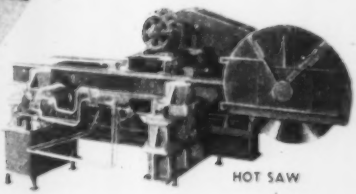
FOR INDUSTRY'S BIG PRODUCTION JOB



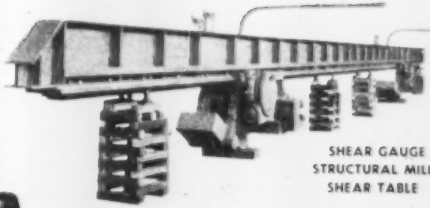
COOLING BED FOR ROUND BARS

Y&T F&M Products

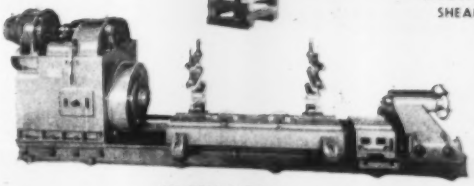
- PARALLOY ROLLS (PINCH, COILER, TENSION, STEEL MILL)
- HYDRAULIC SLAB AND BILLET PILERS
- STRIP AND SHEET OILING EQUIPMENT
- SHEET SCRUBBER AND CLEANING LINES
- HOT SAWS—ROCKING AND SLIDE TYPES
- HOT BEDS—COOLING BEDS—TRANSFERS
- BILLET EJECTORS—PINCH ROLL STANDS
- SLITTERS—SPECIAL SHEARS AND GAUGES
- TILTING TABLES—TRAVELING AND LIFTING TABLES
- CONTINUOUS PICKLING LINES—ROLLER LEVELLERS
- FURNACE CHARGING EQUIPMENT—FURNACE PUSHERS
- STRIP STEEL COILERS AND REELS—SCRAP BALLERS
- RAILROAD SPIKE FORMING MACHINES—ROLL LATHES
- SHEET GALVANIZING LINES—WIRE PATENTING FRAMES
- STRETCHER LEVELLERS—ANGLE AND SHAPE STRAIGHTENERS
- ROLLING MILL TABLES—GEAR AND INDIVIDUAL MOTOR TYPES
- DUCTILE CASTINGS (80,000 PSI)
- MACHINERY BUILT TO CUSTOMER'S DESIGN AND DETAIL DRAWINGS



HOT SAW



SHEAR GAUGE STRUCTURAL MILL SHEAR TABLE

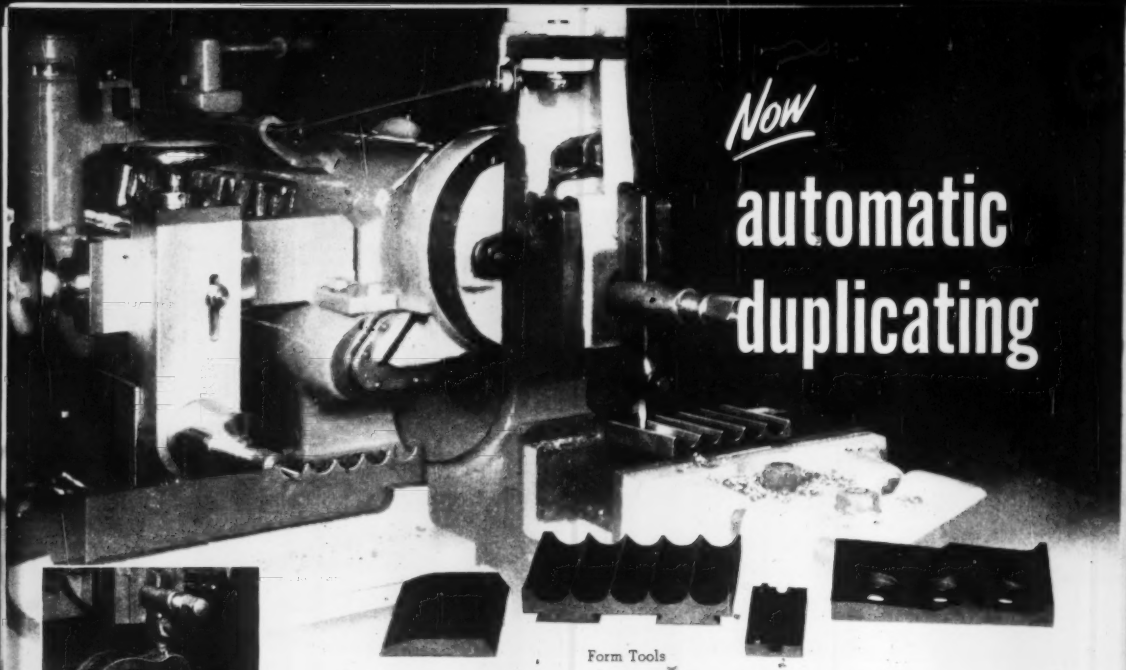


42" ROLL LATHE

The Youngstown Foundry & Machine Co.

OVER SIXTY YEARS OF SERVICE TO THE STEEL INDUSTRY

Youngstown, Ohio



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automatic duplicating

Form Tools

Duplicating a cam

Dies from templates

...ON A CINCINNATI SHAPER

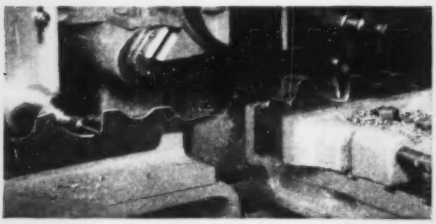
You can duplicate parts on a versatile Cincinnati Shaper with a single point tool, using actual parts or simple sheet metal templates—at new speeds and new low costs.

This automatic duplicating device has a wide application in the tool and die field—and also produces a very large variety of parts in the general shaping field. We illustrate some of these shapes accurately produced at low costs with single point tools.

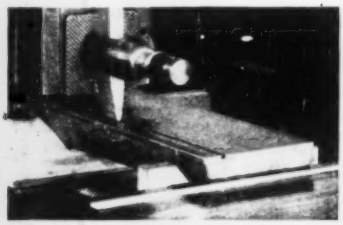
Cincinnati Shapers equipped with this device are instantly reconverted to standard shaping operations and retain all their versatility.

A Cincinnati Shaper with automatic duplicating device can save you time and money in your shop.

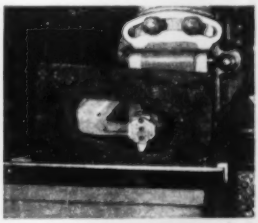
Write for Automatic Contour Duplicating Bulletin DN-1.



Facing 90° shoulders



Interchangeable molds



Duplicating internal contours

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

SHAPERS · SHEARS · BRAKES

CINCINNATI

STEEL

The Metalworking Outlook

July 9, 1951

The Paper Deluge Starts

Get set for a deluge of government orders on distribution controls. One major classification of Washington directives will be limitation orders to come out during this quarter to provide for distribution of steel among manufacturers of consumer durable and other goods not under CMP. Such orders will set up permitted uses of steel calculated on a base period rate of consumption.

For Purposes of Morale

In his quarterly report on rearmament, Defense Boss C. E. Wilson emphasized that arms output is 20 per cent behind schedule. He did so because federal planners are anxious to forestall any letdown in the defense effort. The 20 per cent figure was practically picked out of the air; no one can know exactly what our optimum rearmament rate should be. Actually, we are doing pretty well. Delivery rate of military goods was $500 million monthly before Korea, is now $1.5 billion and is scheduled to hit $4 billion by next June. Industrial output has risen 12 per cent since Korea.

New Deal for Capital Goods Prices?

Capital goods producers are working hard to get a special price control section written into the new Defense Production Act to apply to producers' goods. Extension of the old 1950 act to Aug. 1 gave them new hope of success. They want legislation which would: Require OPS to relate the ceilings to prices in effect during the base period of the General Ceiling Price Regulation; provide that approved increases in wage rates and increase in the prices of suppliers, occurring after the close of the base period, can be automatically passed through as adjustments of the initial ceilings; spell out by statute some reasonable standards for nonautomatic ceiling price adjustments, to prevent administrative authorities from imposing standards like those of CPR 30.

Status Quo in Consumer Credit

Natural economic laws, nudged along by Federal Reserve Board curbs on credit buying, held consumer installment credit outstanding on May 31 to $12.9 billion, about the same as the total a month earlier. In previous years since 1945 installment credit in May has gained substantially over the April level.

Irony in Credit Debate

There's irony concerning the bitter dispute over the FRB's credit controls. Evidence is piling up that most of the decline in consumer spending is attributable to the fact that the buyer is satiated after his gluttonous buying last year and early in 1951. Retail trade has fallen about 7 per cent below the pre-Korean level. FRB curbs may have

Production Engineering News—p. 71 The Market Outlook—p. 127

had a little to do with that, but not nearly as much as overbuying in the last two quarters of 1950 and the first period of 1951.

Less Ferrosilicon Likely

Ferrosilicon production will probably drop about 25 per cent in August and September. That's because one blast furnace in Jackson, O., will shut down for repairs in August and another in Buffalo will close in September. NPA is considering sending out quesfionnaires to all users of the material to get the picture on inventories.

Coal Transport Moves Ahead

Something new in coal transportation may get underway Aug. 25. That's the effective date of a new Ohio law, quietly guided through the state legislature and signed by Gov. Frank J. Lausche. It gives public utility status to pipelines for the transportation of coal and permits condemnation of land needed for right-of-way. The same legislature refused to grant the Ohio conveyor belt that utility status. M. A. Hanna Co. is now building a 3.5 mile experimental pipeline near Cadiz, O., that will test the underground piping of pulverized coal mixed with water. If the experiments are successful, Hanna can build a $6 million pipeline to carry coal from Ohio mines to Lake Erie markets.

Prototype Vessels

Although 25 new-type fast cargo vessels are being built for defense purposes by five private shipyards, American ship builders expect no marked expansion in their activities, unless allout war comes. The new vessels, called the "Mariner" class, could be the prototype for a large fleet if full war occurs.

Straws in the Wind

Thompson Products Inc., Cleveland, and the Aircraft Workers Alliance have agreed upon terms of wage increases tied to the cost-of-living index and amounting to 11 cents an hour . . . Commerce Department's Industry Evaluation Board and National Security Council's Facilities Protection Board will co-operate on a program to strengthen industrial security . . . Consolidated Vultee Aircraft Corp. will build guided missiles at Pomona, Calif. . . . Lockheed Aircraft Corp. will develop a new turboprop medium cargo airplane . . . NPA has published a booklet of questions and answers on CMP which will be available from Commerce Department field offices.

Here and There in Industry

New plant and equipment expenditures may exceed $24 billion in 1951, Korea or no Korea (p. 43) . . . Price rollbacks are out—at least until Aug. 1 when the extension of the 1950 defense act expires (p. 45) . . . Business is multiplying for makers of calculating and accounting machines (p. 46) . . . Europe's 1951 import bill will rise by $3 billion over 1950 (p. 53) . . . A manufacturer of industrial brushes finds the way to boost sales (p. 54).

How's your "moving" picture?

If you're designing equipment where you must provide for material movement, have you considered the flexibility—economy—efficiency of chains and attachments?

And, if you have, do you realize the possibilities for product improvement, cost reduction in the complete Chain Belt line?

In the complete Chain Belt line there is a size and type of chain . . . the *right* attachment that will exactly fit your requirements. If your machine requires exact, split-second timing, Baldwin-Rex Roller Chain and one of its many standard or special attachments will answer your need.

If split-second timing is not required and low cost is important, perhaps Baldwin-Rex Double Pitch Roller Chain or a Rex Cast Chain is the answer. If corrosion is a problem, a Rex Z-Metal Cast Chain will do the job.

If your problem involves the handling of cans, bottles, jars, or small parts and packages, Rex TableTop® provides an efficient, economical answer. For heavier duty service, Baldwin-Rex Plate Top Chain is an efficient, low cost mover.

For extremely heavy load, heavy-duty service, Rex Chabelco Steel Chains offer a wide range of sizes and types with attachments that provide years of efficient carrying service.

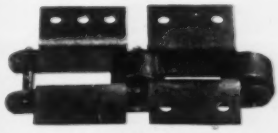
Because the Chain Belt line is complete . . . our Field Sales Engineers can recommend the exact chain that is exactly right for your requirements. You'll find their highly specialized knowledge valuable to you in getting lower costs—improved performance from your equipment.

Call or write your nearest Chain Belt Field Sales Office or mail the coupon for your copy of Bulletin 50-35.

★ *The chain attachments illustrated are just a few of the many standard designs found in the complete Chain Belt line.*

Style E Attachment

Style A Attachment



Style K Attachment

Style A Attachment

Style H Attachment

Style D Attachment

Chain Belt COMPANY of MILWAUKEE

REX CHAIN & TRANSMISSION DIVISION
Milwaukee 4, Wis.

BALDWIN-DUCKWORTH DIVISION
Springfield 2, Mass.

REX
® BALDWIN REX

Chain Belt Company 51-105A
1660 W. Bruce St.,
Milwaukee 4, Wisconsin

Gentlemen:
Please send me bulletin 50-35.

Name.....

Company.....Dept.....

Address.....

City.....State.....

There's An Atom Bomb In This Headline

Донт Тирн Уоир Скрап Ін!

—It could sabotage our whole defense effort, disrupt our civilian economy and nullify our steel expansion program. In the Russian alphabet it spells:

"Don't Turn Your Scrap In!"

In this light, those who fail to turn in theirs are unwittingly but none the less effectively giving "aid and comfort" to those who would destroy us.

This is not just so much "scare" talk

• Turn Your Scrap IN— Help Turn More Steel OUT •

There's no denying that open hearth scrap inventories are dangerously low. Supplies normally sufficient for 60 to 90 days, range now from a few weeks to as little as two or three days. Any further shrinkage, even slight, could shut down some furnaces completely and badly cripple over-all steel production.

Have you made a thorough search for dormant scrap in and about your plant? Ferret out every piece. Sell it *today*. Every extra ton will help sustain steel output and safeguard defense and civilian production objectives.

What's more, like the bread cast upon the waters, your scrap will come back to you in more steel and more steel components to keep your own business going.

DETROIT STEEL CORPORATION

DETROIT 9, MICHIGAN

PORTSMOUTH DIVISION, Portsmouth, Ohio
DETROIT and EASTERN MILL DIVISIONS, Detroit, Mich. and New Haven, Conn.
RELIANCE STEEL DIVISION, Chicago, Cleveland, Detroit, New Haven
CRAINE-SCHRAGE STEEL DIVISION, Detroit, Mich.

Two Yokes

In observing the 175th anniversary of the signing of the Declaration of Independence, an unusually large number of American citizens last Wednesday read the text of that important historical document. Many hesitated and pondered when they came to these words:

"Prudence, indeed, will dictate that governments long established should not be changed for light and transient causes; and accordingly all experience hath shown that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. But when a long train of abuses and usurpations, pursuing invariably the same object, evinces a design to reduce them under absolute despotism, it is their right, it is their duty, to throw off such government, and to provide new guards for their future security."

This explanation precedes a list of 27 specific acts of oppression by the King of Great Britain. As Americans read these charges today, they compare the ills they suffered under King George III in 1776 with their trials and tribulations in 1951. Many feel that some of the major complaints against the King's rule are similar to those which can be charged against our government in Washington today. As a result of happenings occurring largely within the past two decades, our government has become so large, so bureaucratic and so powerful that its demands upon the people for excessive taxes and unwarranted sacrifice of individual freedoms are almost as obnoxious as those of King George.

What we need most today is a rebirth of the spirit of 1776 that will alert American citizens to the importance of preserving their rights. We have in Washington a few representatives of the people in both parties who are aware of the danger of our present too-powerful, bureaucratic government. They need the support of every right-minded citizen.

Our forefathers shook off the yoke of a King's oppression. Why can't we unite to shake off the yoke of the spend-like-mad, tax-to-the-hilt, scare-'em-to-death, synthetic-crisis, impotent and inefficient administration that is our curse today!

E. L. Shaner

EDITOR-IN-CHIEF

WORTHWHILE SALVAGE: In view of the abundant publicity given to the abandonment of military equipment in Pacific islands following VJ Day, it is gratifying to learn that civilian employees of the Army, starting in 1948, have done a pretty good job in retrieving part of the discarded materiel. They have collected about 200,000 tons of unserviceable major ordnance items, which would have cost $500 million to replace.

This materiel was shipped to central depots, identified, cleaned, preserved and repacked for

reshipment to points where it could be utilized by the Far East Command. Under this procedure, a 2½-ton truck costing $2700 in World War II, can be rebuilt for $1000, whereas a new truck would cost $7000. Economy of this kind is rare today. Taxpayers would like to see more of it. —p. 44

RECORD PLANT OUTLAY: Regardless of what happens in Korea, expenditures for new plant and equipment in 1951 will top the $18.6 billion spent in 1950, the $18.1 billion in 1949 and the previous high of $19.2 billion in 1948. According to estimates of Securities & Exchange Commission and Department of Commerce, outlay for new plant and equipment for the first nine months of this year will reach $17,980 million and expected outlay in the final quarter will lift the total for the year to around $24 billion.

Largest expenditures are for the manufacturing industries. A study by Defense Production Administration shows that from 1939 to 1951 the percentage of total expenditures for manufacturing facilities has shifted moderately geographically. The percentage of the total has not changed appreciably in New England, Middle East and South East. The Central region and the Far West have lost, whereas the South West has gained substantially and the North West slightly. —p. 43

SELLING THE "FIELD": Glancing through the "success" story of the ten-year program of Osborn Mfg. Co. to develop its power-driven brush business, one comes upon this arresting sentence: "Keystone in the new policy was the decision to sell brushing first and Osborn brushes, second."

Here is a text which has wide application in the metalworking industries. Stiff competition prevails in most sectors of this field. The temptation to sell by comparing the superlative values of your product with the inferior qualities of your competitors' products is strong. However, no matter whether you are selling castings, forgings, weldments, pressed metal parts or what not, the chances are good that if you sell the field first and then use every legitimate means to get your share of the business, you will fare much better than if you try to sell by disparaging the other fellow's product.

Sell welding, castings, stamping, etc. first; then your own strong points. —p. 54

PROBE GRAY MARKETS: In a period when Senate investigations seem to be quite popular, the freshman senator from Michigan is inaugurating an examination of government policies with respect to the allocation of steel. Blair Moody, ex-Washington newspaper correspondent who succeeded the late Arthur Vandenberg, heads a subcommittee which probably will begin its activities with hearings on gray market operations in Detroit.

Every steel producer and consumer will be interested in the outcome of these hearings. Many major sellers have wondered how certain tonnages from their mills have drifted into the possession of persons who definitely are not on their customers' lists. Numerous buyers are confused by the apparent ease with which some customers seem to be able to get supplies while others report great difficulty or failure. All concerned will watch the Moody investigation closely, wondering whether it will uncover facts not already known. —p. 57

NEW CARTRIDGE CASES: According to the competent ordnance experts, we are entering a period in which the time-honored artillery cases of brass will be replaced by cases of steel. The transition will not be easy. The men who do the fighting have a strong preference for the brass product, but technological and economic factors are making the change imperative.

On the economic side, copper and zinc required for cartridge brass are not available in sufficient quantity. From the technical standpoint, new weapons and ammunition now under development require physical properties in the cartridge case that are decidedly beyond the range possible in brass alloys but are easily within the capacity of steel.

Therefore we are confronted with a problem, first, of perfecting techniques to enable manufacturers to produce steel cases economically and secondly, of convincing the artilleryman that the ferrous shell is O. K. Present progress indicates that both hurdles will be surmounted. —p. 72

Tool Steel from Ryerson

Easier to Buy...Safer to Use

Steel procurement is trouble enough these days without adding unnecessary steps. That's one reason why more and more metal working shops are ordering tool steel from Ryerson, their regular warehouse steel source. This way, one call often does the work of two. One order, one invoice covers tool steel *and* other requirements.

You can safely buy this way because Ryerson tool steel stocks meet high standards of quality. Every bar is unmistakably identified by type with full length color marking. And with every shipment you get exact instructions on how to harden your Ryerson tool steel.

Hundreds of tons of tool steel are on hand at Ryerson plants, ready for quick shipment. Included are oil hardening steel, water hardening steel, flat ground stock—all the types described at the right. We suggest that you investigate the performance on these steels. For in addition to their high quality, Ryerson tool steels are economical in price. Call the Ryerson plant nearest you.

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✓ **RY-ALLOY**—A special analysis, *oil hardening* tool steel. Ry-Alloy machines better than most steels of its type; attains high hardness and deep penetration after treatment. Order it in rounds, squares and flats from a wide size range, all spheroidized annealed.

✓ **VD TOOL STEEL**—A *water hardening* carbon-vanadium steel available in rounds, flats and squares of many sizes. Retains its fine grain even when overheated. Spheroidized annealed.

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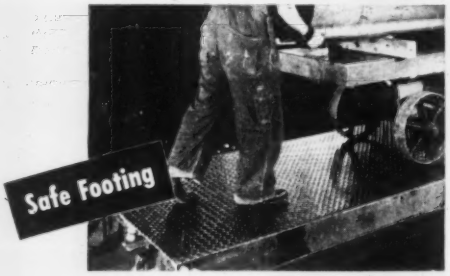

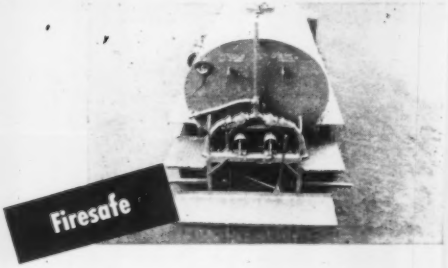

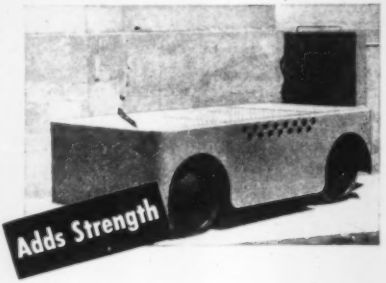

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Capital Outlays Will Hold High

Whether war or peace in Korea, peak expenditures for new plant and equipment—a major support of the economy—should continue, for perhaps a $24 billion total in 1951

NEW PLANT and equipment expenditures may exceed $24 billion in 1951, Korea or no Korea.

Nobody can yet know what peace in Korea will do to the American economy as a whole, but accurate estimates can be made for capital outlays because commitments for that major support of the economy have already been made pretty much for the entire year. Economists agree that a chief bulwark of the present boom is expenditures for industrial construction and producers' goods.

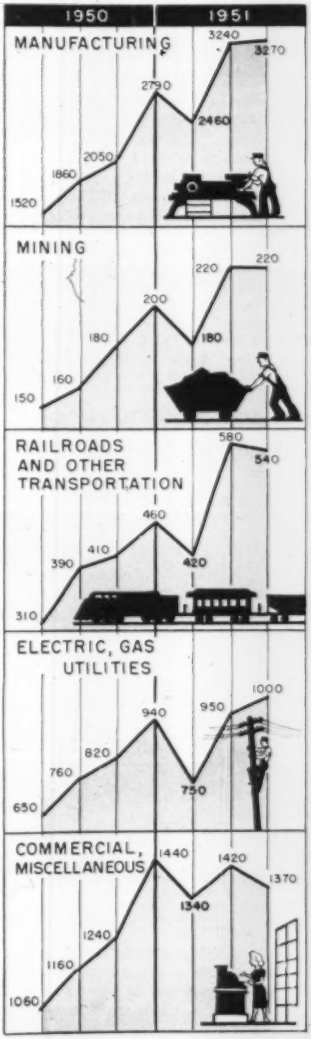
Still High—Even if capital outlays do decline, the dollar volume probably will still be above the $18.6 billion spent in 1950, the $18.1 billion in 1949 and the previous record of $19.2 billion in 1948. The charts on this page indicate that total third-quarter expenditures, as estimated by the Securities & Exchange Commission and the Department of Commerce, have already been set at $6.4 billion. Outlay for the first nine months of 1951 will reach $17,980 million, the U. S. agencies estimate. That's practically at an annual rate of $24 billion. The $24 billion will be spent if total fourth quarter expenditures hit $6 billion, $400 million below expected third-quarter outlays and $420 million less than actual second-quarter expenditures.

Some of the dollar gain in 1951 capital expenditures is accounted for by inflation. Prices now are about 10 per cent higher than average levels in 1950 and 1948. Adjusting the 1951 expected capital outlay of $24 billion to 1950 and 1948 price levels, you still get $21.6 billion, 16.1 per cent above 1950 and 12.5 per cent above 1948.

Biggest—A glance at the charts shows that expenditures for new plant and equipment by the manufacturing industry are the largest of outlays for all categories; they have also risen the most. Expenditures in the manufacturing category for this third quarter will be 59.5 per cent above those of the third quarter in 1950; 22.2 per cent higher in mining; 31.7 per cent greater in transportation; 21.9 per cent for electric and gas utilities; and 10.5 per cent in commercial and miscellaneous classifications. Nearly half of manufacturers' capital outlay this year is for iron and steel production facilities.

Plant and Equipment Expenditures

(Quarterly figures in millions of dollars)



Sources: Securities & Exchange Commission and Department of Commerce

Certificates of necessity permitting five-year amortization rights on expansions have been granted almost entirely for manufacturing projects. A study completed by Defense Production Administration reveals that manufacturers who are expanding under the amortization program are turning more and more to such states as Arkansas, Texas, Oklahoma and Colorado.

The Scene Shifts—DPA has figured (see the table below) the geographic distribution of manufacturers' expenditures for new plant and equipment in 1939 and 1947 and has compared it with the geographic distribution of tax-amortized projects approved as of May 7, 1951. In the amortization program, New England, Middle East and Southeast states account for about the same proportion as in the earlier two years. But the Southwestern states will have about 15.5 per cent of the amortized total, in contrast to an average of 5 per cent in 1939 and 1947 for that area. The Central states' share is reduced from an average of more than 36 per cent in 1939 and 1947 to 23 per cent in the accelerated amortization facilities expansion. The Northwest also gained, but, surprisingly, the Far West area dropped.

The Sections Where Manufacturers' Capital Expenditures Go

(per cent of total outlays)

	1939	1947	1951
New England	8.2	7.0	7.7
Middle East	28.9	26.1	28.6
Southeast	12.6	13.8	14.4
Southwest	4.5	5.7	15.5
Central	37.3	35.8	23.2
Northwest	2.1	2.3	5.5
Far West	6.5	9.3	5.0

Kaiser, Inland Get Tax O.K.'s

Two steel producers received certificates of necessity permitting them to accelerate tax amortization on expansion projects. They are Kaiser Steel Corp. and Inland Steel Co.

Kaiser was given special tax benefits on a $54,939,000 program to build a blast furnace and related facilities at its Fontana, Calif., plant. This will be the third blast furnace there. One furnace was blown in in December, 1942, in connection with the building of the Kaiser Fontana mill during World War II. The second stack and additional coke ovens started operating in October, 1949.

The Fontana plant was built origin-

ally to produce plates, structurals and bars. The Kaiser company is now rounding out its finishing facilities. It installed a new hot strip mill and also added facilities to produce line pipe and small diameter pipe. A 72-in plate mill is now being installed.

Inland is not planning steel ingot or finishing facilities beyond those announced some time ago. The 70 per cent of $6,809,386 just allowed for fast amortization covers some of the cost of materials handling equipment already installed and also part of the cost of a new coke oven battery completed last September (STEEL, Sept. 25, 1950, p. 161). Just last month Inland was allowed 75 per cent fast amortization of the $29,100,600 cost for expanding steel ingot facilities. That work will raise ingot capacity to 4.5 million tons. Inland also in June was allowed 80 per cent of $3,015,000 for dieselizing two ore carriers and lengthening the *D. D. Block*.

New Blast Furnace at Neville

Pittsburgh Coke & Chemical Co. awarded Koppers Co. Inc., Pittsburgh, contracts for the building of a new blast furnace at its Pittsburgh Neville Island plant. The new furnace will be designed and constructed by the Freyn engineering department of Koppers Engineering & Construction Division. It will have a hearth diameter of 22 feet and will be capable of producing about 850 tons of pig iron per day. Pittsburgh Coke & Chemical now has one other blast furnace of about the same size; the new addition will double capacity.

Republic Gets Coke Facility

Niagara Mohawk Power Corp. sold the coke-producing facilities at its Troy, N. Y., coke and gas plant to Republic Steel Corp., Cleveland. The facilities adjoin Republic Steel's blast furnace at Troy. Coke from the Troy plant was continuously purchased by Republic. By the transfer Republic will have its own coke plant besides its blast furnace for the production of pig iron.

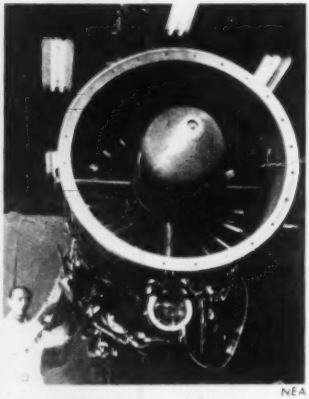
Meeting on Thomas Sale Called

Directors of Thomas Steel Co., Warren, O., called a special shareholders' meeting for Aug. 7 to act on the sale of assets to Pittsburgh Steel Corp. and to dissolve the firm.

Berry Motors Merged into Oliver

Merger of Berry Motors Inc., Corinth, Miss., into the Oliver Iron & Steel Corp., Pittsburgh, was announced by Theodore F. Smith, president of Oliver. The Pittsburgh company acquires all assets, patents and property of Berry Motors, which will be operated as the Berry Division of Oliver Iron & Steel Corp. It will continue to manufacture rotary power hydraulic pumps, motors and industrial transmissions at the Corinth plant.

Berry only recently emerged from the pilot-plant stage of operation and is now in commercial production. Oliver, a manufacturer of industrial fasteners, small forgings and pole line hardware, has been in continuous operation in Pittsburgh since it was founded in 1863 by Henry W. Oliver.



NEA

POWERHOUSE: Ready for the test cell at General Electric's Lockland, O., plant is the J-47-GE-21 jet engine, first of the advanced J-47 series. It puts out far more thrust than current J-47s rated in excess of 5200 pounds. Accessories have been moved underneath the nose to provide greater air inlet area to the compressor

Trailmobile Sold to Pullman

A majority of stockholders (81 per cent) approved sale of the assets of Trailmobile Co., Cincinnati, to Pullman Inc. Trailmobile will become a Pullman subsidiary and continue to manufacture truck-trailers.

Big Press On Way to Lockheed

Two 160-ton main sections of a $750,000 Birdsboro press will be installed soon at the Lockheed Aircraft Corp. plant, Burbank, Calif. Weighing as much as nine army tanks, the crown and bed of the press, loaded on heavy duty, 16-wheel flat cars are rolling westward from Birdsboro, Pa., at reduced speeds over specially selected routes.

The hydraulic metal-forming press, built by Birdsboro Steel Foundry & Machine Co., will weigh more than 2,370,000 pounds when it is completely assembled. Of Lockheed design, it will exert 8000 tons of pressure to produce integrally stiffened wing sections and other parts in solid pieces as large as 10 by 30 feet. Self-strengthened parts will replace units now composed of scores of small parts welded and riveted together.

Army BIG-5 Saves Vehicles, Equipment in Far East

BECAUSE neither personnel nor facilities were available to crate and ship materiel strewn about the Far East in the wake of rapid demobilization after the last war, most of it was left behind. But in 1948 Army civilian employees from the United States began a systematic combing of Guam, Saipan, Okinawa, Korea, the Philippine Islands and Japan itself for all unserviceable major ordnance items and mountains of unidentified spare parts and materiel.

The vast program (dubbed the BIG-5 for Base Industrial Group fifth echelon maintenance) netted about 200,000 tons of miscellaneous items that still were useful.

It saved equipment that might have cost $500 million to replace, the Army Department estimates.

General Purpose—The project's aim was rebuilding of general purpose vehicles and power train units for Ordnance support of troops. Reclaimed materiel was loaded aboard LST's and sent to such places as Oppama Ordnance Shop, one of five installations established to carry on the BIG-5 project. More than 800 LST's discharged on Oppama docks the cargo collected from the many islands. From that point it was dispersed through regular supply channels after being identified, cleaned, preserved and repacked with nomenclature, stock number and other pertinent data on the outside of the containers. That enabled the Far East Command to make use of the thousands of spare parts thus saved.

BIG-5, through its established mass production technique, was able to keep fighting men well supplied with automotive equipment at a minimum cost. Current procurement figures, for example, indicate that a $2\frac{1}{2}$-ton truck costs about $7000. Cost of a similar truck in World War II was about $2700. The cost entailed by BIG-5 in rebuilding one of the trucks—taking into account the cost of its transportation—was about $1000.

Taxpayers will be happy to learn that facilities of BIG-5 are still operating.

Price Rollbacks Out—At Least Until Aug. 1

Congressional action extending the Defense Act of 1950 to Aug. 1 hamstrings some phases of OPS' pricing curbs and prohibits it from rolling back prices

PRICE ROLLBACKS on manufacturers' products are out of the picture, at least for a while.

In extending the Defense Production Act of 1950 for 31 days (from June 30 to Aug. 1), Congress prohibited the Office of Price Stabilization from rolling back prices.

Shelved—This wing-clipping forced OPS to cancel plans for putting into effect July 2 its new "pre-Korea plus" orders, since they would have brought some price rollbacks. These orders were to have replaced price ceilings set under the general wage-price freeze of last January with new ceilings basing prices on pre-Korea levels plus certain materials and labor cost increases since then.

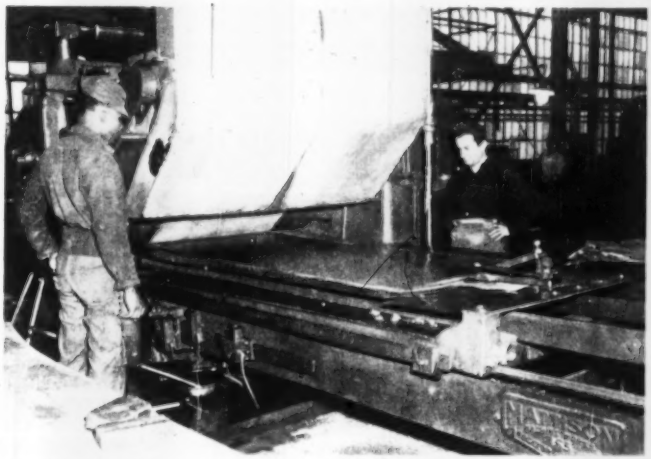
To comply with the prohibition Congress placed on rollbacks, OPS issued General Overriding Regulation 13 which froze ceiling prices in effect on June 30 for commodities or services covered by specified manufacturers' regulations.

Affected — OPS officials said the regulations affected are: CPR 22, Manufacturers' General Ceiling Price Regulation; CPR 30, Machinery and Related Manufactured Goods; CPR 37, Primary Cotton Textile Manufacturers' Regulation; CPR 41, Shoe Manufacturers' Regulation; CPR 45, Apparel Manufacturers' General Ceiling Price Regulation; and CPR 18-Revised, Manufacturers' Prices for Wool Yarns and Fabrics.

Manufacturers pricing under these regulations, OPS officials said, will remain under the pricing provisions of the General Ceiling Price Regulation, if they had not yet established ceiling prices which became effective on or before June 30, 1951. Manufacturers who had filed new ceiling prices in late June, but who had not yet met the 15-day waiting period requirements before increasing prices, must continue to use their ceiling prices under the GCPR until further notice. In cases where proposed prices were returned for revision, manufacturers must also continue to use their GCPR ceilings. Manufacturers who had already established new ceiling prices under these regulations, whether they constituted advances or rollbacks, are permitted to keep those new ceilings in effect.

Sit Tight—Sellers who have not yet filed their reports under the regulations in question need not do so until further action by the OPS. Reports on file are not countermanded, however. Whether such reports containing proposed increases in ceiling prices became effective on June 30, 1951, may depend on the waiting provisions of the regulation. Under CPR 22, reports of ceiling price increases received by OPS after June 14, 1951, will not have the effect of establishing a ceiling price in effect on June 30, 1951, since the 15-day period after date of receipt would not have expired on or before June 30, 1951. Ceiling prices for commodities covered by such filings thus will remain at their GCPR level.

Just before the OPS was bridled, it announced it was postponing indefinitely the effective dates for placing some specific commodities under the general manufacturers' order (CPR 22) and the machinery manufacturers' order (CPR 30). The commodities for which extensions were authorized were to be placed under new specially designed regulations or handled under supplementary pricing provisions.



PROUDLY IT HAILS: Span of Alan Wood Steel Co.'s existence—it is celebrating its 125th anniversary this month—covers the major period of the steel industry's development. Installation of its 30-inch hot strip mill is the first in eastern Pennsylvania; its cost: $9 million. Alan Wood spent over $21 million in the last five years. Treatment plants for waste water alone involved expenditure of $1.1 million. Here, two workmen rough grind a perma-clad sheet in the first step of the polishing process

Lower Scrap Freight Rates Asked

The Interstate Commerce Commission scheduled a hearing July 24 on the appeal by the Institute of Scrap Iron & Steel Inc. for lower freight rates in eastern territory to reward shippers of heavily loaded cars.

The institute asked for about a 20 per cent reduction in freight rates on cars of scrap loaded to 80,000 pounds or more per car.

An ICC decision still is awaited on the institute's appeal for a reduction in freight rates in southern territory. Since the filing of that case, many reductions were made voluntarily by railroads.

Roll Maker Faces Antitrust Suit

A civil antitrust suit filed by the U. S. Department of Justice charges Blaw-Knox Co., Pittsburgh, participated in unlawful cartel arrangements which restrain interstate and foreign trade in cast metal rolls.

Named as co-conspirators are: Sir W. G. Armstrong Whitworth & Co. (Ironfounders) Ltd., New Castle-on-Tyne, England; Jarrow Metal Industries Ltd., London, England; and John Jarvis, Surrey, England.

New Chiefs Take Over

Philip R. Bradley has retired as chief of the Ferro Alloy Branch, Defense Minerals Administration, and returned to his business of consulting mining engineer in San Francisco. Replacing him is George B. Holderer, mining consulting engineer.

Weston Bourret, acting chief since April of DMA's Minor and Rare Metals Branch, has been appointed chief.

Multiplying Business

Sales volume in the calculating and accounting machine industry is well above last year

BUSINESS is multiplying for makers of calculating and accounting machines—largely because of increasing government controls that make greater demands on clerical staffs in industry.

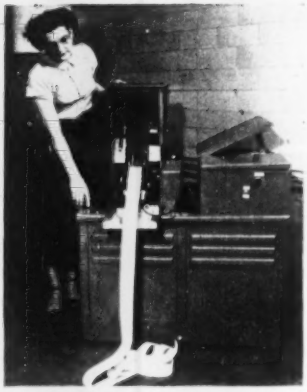
In the first five months of this year, the sales volume of the ten major manufacturers of calculating and accounting machines was about 70 per cent over the same period in 1950. Orders in the first quarter of this year were some 20 per cent above new business placed in the fourth 1950 quarter. In the last 60 days, business has shown some slackening, but it's still high.

The Reason Why—Thus, the Korean War has given an impetus to an industry that has already had and expects to have even more long-range expansion. One out of eight in the work force is a clerical person today, for an office force of 8 million. That's 30 times as many office workers as were employed in 1873, when the first business machine, the typewriter, was introduced. Manufacturing employment now is only seven times the 2.1 million employed in all industries about 1870.

In this war, calculating and accounting machines are recognized as essential, and some of the industry's volume is now going to the government. What's more, the industry is well suited to precision defense work and is getting into it. That, plus sales of its equipment to the government, has forced a 35 per cent reduction in output for civilian users. Civilian buyers are having the greatest trouble getting check perforation, stamping, canceling, signing, counting and sorting devices.

A Little Help—The essentiality of the equipment has helped manufacturers with materials. Producers of all types of business machines use only 0.3 per cent of all the steel produced. The industry is an even smaller user of brass, aluminum and nickel. While it has problems with materials, the industry finds its major difficulty is with skilled manpower. A company like Burroughs Adding Machine Co. needs all the seasoned labor it can get to turn out the 70,000 different parts its devices require. Most firms in the industry make 90 to 95 per cent of all their own parts.

Subcontracting is not too practical a means of boosting calculating and accounting machine production. If manpower scarcities force them to it, companies in the industry will probably farm out parts that can be handled in job stamping shops. Deliveries of calculating and accounting machines take as long as 12 months. Even on some of the smaller, standard adding devices shipment takes two to four months. That situation has led National Production Authority to consider at least the possibility of distribution controls to essential users. The industry is cool to the idea.



TESTING AN ADDING MACHINE
. . . at American Automatic Typewriter

Research—New calculating and accounting problems have led to the development of new machines, mainly of the mechanical and electromechanical type. There's a great future for electronically controlled equipment, but thus far it is too expensive to manufacture for widespread use. Electronic machines would be used for business accounting if cost were no object. But cost still is an object. At present there is not as great a need for higher speeds in machines as there is for ease of input and output of the information. Business machines are reaching the point where they are without adequate materials handling equipment to and from.

One major development in an electronic machine is an automatic computer with a mercury memory that can retain 80,000 information items simultaneously. It uses 5400 electronic tubes and magnetic operating features. The problem is to simplify it so that more than the present handful of companies can afford to buy it.

Wide World

CAN-HUNGRY: High speed and non-shock operation are big features of this 1500-case-per hour packaging machine. The caser picks up 12 cans at a time and, in a double operation, places 24 in a box. Upright travel on conveyor belts helps avoid denting or other damage. Only manual operation is loading empty boxes, and that will soon be a robot operation

Mechanical Brain Gets Air Borne

A new digital differential analyser built by Computer Research Corp. to specifications of North American Aviation Inc. will soon be airborne and grinding out answers to complicated electromechanical problems high above the earth.

Part of a "flying laboratory" the company is preparing for in-flight testing of guided missile components, the computer has already proven satisfactory for operations under varying conditions of altitude, temperature and vibration—conditions not previously required of a digital mechanical brain. Guidance equipment, such as automatic control and navigation units, can be interconnected with the "brain" which will then do a lot of the "heavy thinking" for scientists.

The new flying brain will provide information the North American scientists seek to support other data obtained with digital and analogue computers in operation in many company laboratories. These grounded computers are being used to flight test both plane and missile components by providing computations based upon theoretical flight data.

Three Groups Pace Employment

Fabricated metal products, primary metal industries and shipbuilding were three of the six heavy goods industries in the San Francisco-Oakland metropolitan area accounting for more than 72 per cent of the 13 per cent gain recorded in manufacturing employment in April, as compared with the like month in 1950.

Wage and salary workers in the area's manufacturing plants rose to 172,400 persons, an advance of 19,400 over a year ago, says California's Department of Industrial Relations.

Rating Symbols for Use Under Controlled Materials Plan

HERE'S a complete list of symbols to be used to identify allotments of materials under the Controlled Materials Plan. They were announced by the National Production Authority. Of the 141 symbols, 71 are for use in connection with major defense programs of the government. The remaining 70 are for use in connection with production of goods listed in NPA's "Official CMP Class B Product List."

Sym'l	Major Program Involved	Agency or Industry Div. Etc.
A-1	Aircraft	Dept. of Defense
A-2	Guided Missiles	Dept. of Defense
A-3	Ships	Dept. of Defense
A-4	Tank-Automotive	Dept. of Defense
A-5	Weapons	Dept. of Defense
A-6	Ammunition	Dept. of Defense
A-7	Electronic and Communications Equipment	Dept. of Defense
A-8	Fuels and Lubricants	Dept. of Defense
A-9	Clothing & Equipage	Dept. of Defense
B-1	Building Supplies and Equipment for Construc.-Troop	Dept. of Defense
B-2	Subsistence	Dept. of Defense
B-3	Transportation-Equip.	Dept. of Defense
B-9	Production-Equipment	Dept. of Defense
C-2	Dept. of Defense Construction	Dept. of Defense
C-3	MRO	Dept. of Defense
C-9	Miscellaneous	Dept. of Defense
Z-9	Prod. Equip. for certain Priv. Contractors	Dept. of Defense
D-1	Construction	Dept. of Army
D-2	Other	Dept. of Army
E-1	Construction	Atomic Energy Commission
E-2	Operations (Including MRO)	Atomic Energy Commission
E-3	Privately-Owned Facilities	Atomic Energy Commission
F-1	Construction	Federal Civil Defense
F-2	Other	Federal Civil Defense
F-3	Construction	Federal Security Admn.
F-4	Other	Federal Security Admn.
F-5	Construction	General Services Admn.
F-6	Other	General Services Admn.
F-7	Construction	Veterans Administration
F-8	Other	Veterans Administration
F-9	Construction	Housing & Home Finance Ag'y
G-1	Other	Housing & Home Finance Ag'y
G-2	Construction	Department of Agriculture
G-3	Other	Department of Agriculture
G-4	Construction	Defense Transport Admn.
G-5	Other	Defense Transport Admn.
G-6	Construction	Canada
G-7	Other	Canada
H-1	Construction	Petroleum Admn. for Defense
H-9	MRO (Order M-46)	Petroleum Admn. for Defense
H-2	Other	Petroleum Admn. for Defense Department of Interior:
H-3	Construction Major Plant Additions (Order M-50)	Defense Elec. Power Com.
H-4	Minor Requirements including MRO (Order M-50)	Defense Elec. Power Com.
H-5	Construction	Defense Minerals Admn.
H-6	Other	Defense Minerals Admn.
H-7	Construction	Defense Solid Fuels Admn.
H-8	Other	Defense Solid Fuels Admn.
J-1	Ship Building for Maritime Account	Dept. of Commerce: Maritime Adm.
J-2	Private Ship Building Maritime Sponsored	Maritime Adm.
J-3	Construction	Bureau of Public Roads
J-4	Other	Bureau of Public Roads
J-5	Construction	Civil Aero. Admn. & Civil Aero. Board
J-6	Other	Civil Aero. Admn. & Civil Aero. Board
W-1	Construction	International Trade (Office of)
W-2	Other	International Trade (Office of)
W-3	Construction	Economic Cooperation Admn.
W-4	Other	Economic Cooperation Admn.
J-7	All	Department of State Voice of America
T-8	Construction	Water Resources Division
T-9	M.R.O.	Water Resources Division
U-1	M.R.O. — Operating Constr. (U-1 Self Assigned)	Communications Equip. Div.
U-2	M.R.O. & Operating Constr. (U-2 Application-Authorization)	Communications Equip. Div.
U-3	M.R.O.	Railroad Equipment Division
U-4	Construction	Industrial Expansion Div.
U-5	Construction	Construction Controls Div.
Z-1	All (except Basketing)	Priorities & Directives Div.
Z-8	Basketing under NPA Reg. 2	Priorities & Directives Div.
AM	To transfer aluminum between (a) aluminum producers, (b) aluminum producers and aluminum smelters, and (c) aluminum producers and aluminum distributors.	
FC	To transfer steel between mills for processing into another shape or form which is still a controlled material.	
WH	Prefix to warehouse serial number on shipments to replenish warehouse stocks of controlled steel products.	
PM	Identifies purchase of non-controlled materials by controlled materials producers for use as production materials (except for aluminum acquired by use of symbol "AM") (See Direction 2 to CMP Reg. 1) Small Users (See Direction 1 to CMP Reg. 1)	

Allotment and Rating Numbers for "B" Products Under CMP

Sym'l	Industry Division
K-1	Agricultural Mach. & Implements
K-2	Aircraft
K-3	Aircraft
K-4	Aluminum & Magnesium
K-5	Building Materials
K-6	Building Materials
K-7	Building Materials
K-8	Chemicals
K-9	Communications Equipment
L-1	Construction & Mining Machinery
L-2	Construction & Mining Machinery
L-3	Consumers Durable Goods
L-4	Consumers Durable Goods
L-5	Consumers Durable Goods
L-6	Consumers Durable Goods
L-7	Consumers Durable Goods
L-8	Containers & Packaging
L-9	Containers & Packaging
M-1	Containers & Packaging
M-2	Copper
M-3	Electrical Equipment
M-4	Electrical Equipment
M-5	Electrical Equipment
M-6	Electrical Equipment
M-7	Electronics
M-8	Electronics
M-9	Electronics
N-1	Engine & Turbine
N-2	Engine & Turbine
N-3	Engine & Turbine
N-4	General Components
N-5	General Components
N-6	General Components
N-7	General Components
N-8	General Industrial Equipment
N-9	General Industrial Equipment
P-1	General Industrial Equipment
P-2	General Industrial Equipment
P-3	General Industrial Equipment
P-4	General Industrial Equipment
P-5	General Industrial Equipment
P-6	General Industrial Equipment
T-5	Iron and Steel
T-6	Iron and Steel
T-7	Iron and Steel
P-8	Leather & Leather Products
P-9	Lumber & Lumber Products
R-1	Miscellaneous Metals & Minerals
R-2	Motion Picture Photographic Prod.
R-3	Motor Vehicle
R-4	Motor Vehicle
R-5	Motor Vehicle
R-6	Motor Vehicle
R-7	Ordnance & Shipbuilding
R-8	Ordnance & Shipbuilding
R-9	Ordnance & Shipbuilding
S-1	Petroleum Administration for Defense
S-2	Printing and Publishing
S-3	Pulp, Paper, and Paper Board
S-4	Railroad Equipment
S-5	Railroad Equipment
P-7	Railroad Equipment
S-6	Rubber
S-7	Scientific & Technical Equipment
S-8	Scientific & Technical Equipment
S-9	Scientific & Technical Equipment
T-1	Service Equipment
T-2	Service Equipment
T-3	Textile
T-4	Tin, Lead, and Zinc

How To Form Production Pools

Want to know how to form defense production pools?

Get a copy of the Defense Production Administration's booklet "Pooling Production for Defense." It explains in simple ABC fashion the steps a group of businessmen must take to band themselves together into a pooled production unit to handle defense contracts and subcontracts.

Copies of the booklet may be obtained from Department of Commerce field offices and from the Distribution Section, Printing Services Division, Department of Commerce, Washington 25.

Filing with NPA Simplified

Instead of having to apply to some 12 or 15 NPA industry divisions for CMP steel plate allotments, as appears to be necessary from the listings in the CMP "B" products list, manufacturers of all types of boiler shop products now may file for all their steel requirements with a single NPA unit. This is the Heavy Metal Tanks Section, Engine and Turbine Division.

This section is granting allotments for plates for all such products as heavy steel tanks, pressure vessels, fabricated plate pipe, smokestacks,

breeching, pulp digesters, etc. This unit, incidentally, still is accepting applications for third quarter shipment even though May 31 originally had been set as the deadline.

New Job for William Clay Ford

Youngest of the three Ford brothers, William Clay, has moved into a new spot in the Ford organization. Since joining the company in March, 1949, he has been getting a thorough indoctrination into what makes the company tick. Starting in the sales and advertising department, he was put on the company's negotiating team for its bout with the UAW that summer, and since then has been attached to other staff and operating departments. His new assignment is manager of the quality control department of the as yet unconstructed gas turbine plant of Lincoln-Mercury Division.

An aircraft accessories building will be put up by the Parts & Equipment Manufacturing Division of Ford on a newly acquired 31½ acre site adjacent to its headquarters plant in Ypsilanti, Mich. It will figure in the division's production of aircraft fuel injection systems.

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to U. S. Commerce Department, Division of Printing Services, attention E. E. Vivian, Room 6225, Commerce Bldg., Washington 25. For ESA orders, write J. L. Miller, Economic Stabilization Agency, Room H367, Temporary E Bldg., Washington 25.

Materials Orders

COPPER—Amendment of July 1, 1951, of NPA Order M-11 sharply increases the amounts of copper and copper-base alloy products that must be set aside in the third quarter of 1951 for filling of defense-rated orders.

WOOD PULP—NPA Order M-72, effective July 1, 1951, requires integrated mills to set aside 3 per cent of their chemical wood pulp for purchase by nonintegrated mills, restricts consumption of chemical wood pulp, and limits inventories.

SOLE LEATHER—Amendment of June 28, 1951, of NPA Order M-34 exempts small firms manufacturing shoes or cutting sole leather from restrictions on sole-leather cutting.

PASSENGER AUTOS—Amendment of July 1, 1951, of NPA Order M-68 adds aluminum castings and forgings to the list of materials whose use is limited in automobile production. Actually the amendment does not change the amount of aluminum castings and forgings permitted in production of passenger cars. Prior to the amendment, manufacturers were subject to the 65 per cent base period usage limitation of NPA Order M-7 (aluminum).

FARM EQUIPMENT—Direction 1 to NPA Order M-55A says that materials procurement help under NPA Order M-55A for farm machinery makers is concluded as of the dates on which individual manufacturers receive their CMP authorizations. Direction 1 was issued June 28, 1951.

COMPONENTS—Direction 1 to NPA Order M-60 says that materials procurement help under NPA Order M-60 for manufacturers of components and related products is concluded as of the dates on which individual manufacturers receive their CMP authorizations. Direction 1 was issued June 28, 1951.

MACHINE TOOLS—Direction 1 to NPA Order M-61 says that materials procurement help under NPA Order M-61 for producers of machine tools is concluded as of the dates on which individual manufacturers receive their CMP authorizations. Direction 1 was issued June 28, 1951.

NICKEL—Amendment of June 29, 1951, of NPA Order M-14 extends this nickel conservation order for the third quarter of 1951.

GRAPHITE, ELECTRODES—Amendment of June 30, 1951, of NPA Order M-66 delays until Aug. 1, 1951, the third quarter allocation of artificial graphite and carbon electrodes. The delay was made necessary because of the amount of paper work required to establish allocation. Meanwhile, the industry will operate under M-66, with deliveries of artificial graphite and carbon electrodes being subject to the normal priority sequence except that defense-rated (DO) orders will have a status equal with rated orders bearing an allotment symbol.

ALUMINUM — Revocation of NPA Order M-7 (aluminum for civilian use) was effective July 1, 1951. Provisions of M-7 were incorporated in NPA Order M-47A to limit use in the third quarter, 1951, of aluminum in certain consumer durable goods and related products. Use of aluminum in most other items in the third quarter, 1951, will be regulated by issuance of Controlled Materials Plan allotments.

RAILROAD MRO—NPA Order M-73, issued June 28, 1951, and effective that date, provides a uniform procedure under which rail transportation systems may obtain their requirements for maintenance, repair and operating supplies, and minor capital additions. To achieve an equitable distribution of materials for MRO, NPA established a form, NPAF-105, on which quarterly requirements will be listed in advance.

STEEL's Weekly Summary of Subcontract Opportunities

ANOTHER Armed Forces Subcontracting Exhibit will be held July 27 to August 3 at the Kiel Municipal Auditorium in St. Louis. The exhibit is arranged for small businesses in Missouri, Iowa, Nebraska, Kansas and Illinois. It is added to others already set for Cleveland and Los Angeles (STEEL, July 2, p. 50) and gives potential suppliers a full schedule of opportunities to land the awards they seek.

As a result of contracts reported recently, a few more non-precision parts makers may get new subcontracts. A few will be needed to supply Caterpillar Tractor Co. under a new $20 million award granted by the U. S. Corps of Engineers for production on three models of large track-type tractors. The awards include options for additional machines and parts that could bring the total value to approximately $32 million, says E. B. English, governmental division manager.

Other contracts of interest to area workers follow:

PRODUCT	CONTRACTOR
Motor Scooters, 3-wheel	Cushman Motor Works Inc., Lincoln, Nebr.
Ambulances, 1-ton	A. J. Miller Co., Bellefontaine, O.
Trucks—Earth Borer & Pole Setter	Highway Trailer Co., Edgerton, Wis.
Trucks—Pickup	Fargo Motor Div., Chrysler Corp., Detroit
Trucks—Cargo	Willys-Overland Motors Inc., Toledo, O.
Pumps	Aurora Pump Co., New York
	Wilson-Snyder Mfg. Div., Oil Well Supply Co., Braddock, Pa.
Pumps, diesel fuel oil transfer	Walter H. Eagen Co., Inc., Philadelphia
	Ingersoll-Rand Co., Phillipsburg, N. J.
Electric Winches	Leslie Co., Lyndhurst, N. Y.
Automatic Tensioning Winch	Skagit Steel & Iron Works, Sedro Woolley, Wash.
Electric Windlass, Anchor Assemblies	C. H. Wheeler Mfg. Co., Philadelphia
Main Propulsion Turbines	Western Gear Works, Seattle
Power Units	Westinghouse Electric Corp., Pittsburgh
Motor Generator Sets	D. W. Onan & Sons Inc., Minneapolis
	Continental Electric Co., Inc., Newark, N. J.
	Mestner Electric Co., Cleveland
	Crocker-Wheeler Div., Elliott Co., Ampere Station, N. J.
Power Plant Assemblies	Bcque Electric Mfg. Co., Paterson, N. J.
	Vickers Electric Div., Vickers Inc., St. Louis
	DuMont Aviation Co., Long Beach, Calif.
Dynamotors	Lycoming Spencer Div., Avco Mfg. Corp., Williamsport, Pa.
Motors	Wolverine Diesel Power Co., Detroit
	Radio Corp. of America, Camden, N. J.
Switchboards	Marble Card Electric Co., Gladstone, Mich.
Signal Generators	Servo Tek Products Co., Paterson, N. J.
Radio Receivers, Transmitters	North Electric Mfg. Co., Galion, O.
Meter Assemblies	Measurements Corp., Boontown, N. J.
Mobile Training Units	Victor Div., Radio Corp. of America, Camden, N. J.
	Continental Electric Co., Newark, N. J.
	Republic Aviation Corp., Farmingdale, Long Island, N. Y.

TIN CANS — Amendment of July 1, 1951, of NPA Order M-25 establishes for the first time quotas and preference ratings on the use of cans made of black plate. The amendment was effective July 1.

OIL AND GAS—Supplement 1 to NPA Order M-46 sets forth regulations and instructions for the use of allotment numbers to procure controlled materials and fabricated items for operators in the petroleum and gas industries in the U. S. and Canada. M-46 had made priorities assistance available, and Supplement 1 assigns allotment numbers for use in connection with it. Supplement 1 was effective June 29, 1951.

HIDES—Amendment No. 1 to NPA Order M-62 extends until July 31, 1951, the NPA restrictions governing the processing of horsehides and certain other hides and skins. The amendment was issued June 29, 1951.

TIN—Amendment of July 1, 1951, of NPA Order M-8 makes these principal changes in regulations on pig tin: 1. All users are limited to a rate of 90 per cent of their usage of pig tin in the first six months of 1950. Heretofore they were allowed this rate, plus the amount required to produce implements of war. 2. Amount of pig tin that can be bought without an allocation is reduced from five long tons to 6000 pounds. 3. Inventory of lead base alloys that is permitted is reduced from 60 to 45 days. 4. Manufacturers of milk cans and tin plate are removed from the 90 per cent quota limitation, inasmuch as they are now programmed and may consume only that pig tin specifically authorized by NPA.

NPA Regulation

AID TO CANADA — Amendment of June 29, 1951, of NPA Regulation 3 places Canadian producers covered by existing NPA orders and regulations under provisions of the Controlled Materials Plan on a basis comparable with U. S. manufacturers. The amendment was effective June 29.

Price Regulations

LEAD SCRAP—Ceiling Price Regulation 53 issued by the Office of Price Stabilization June 29, 1951, and made effective that date, rolls back lead scrap ceiling prices to levels normally related to those for the primary metal. The regulation establishes dollars-and-cents ceilings for battery lead scrap and other lead scrap materials, secondary lead, and primary and secondary antimonial lead, as well as prices for brokerage services connected with sales of scrap battery lead plates.

ALUMINUM—Ceiling Price Regulation 54 issued by the Office of Price Stabilization June 29, 1951, and made effective that date, rolls back prices of secondary aluminum ingot and aluminum scrap to levels reflecting the value of metallic content in terms of current prices for primary aluminum. The new ceilings are 30 to 50 per cent below prevailing market figures.

MILITARY EXEMPTIONS—Amendment 2 of General Overriding Regulation 9 of the Office of Price Stabilization expands its list of military items exempt from all price control when sold under the defense program to include tactical trucks and trailers, tanks, self-propelled artillery, cargo tractors, amphibious cargo tractors, and armored infantry carriers. The amendment was effective June 27, 1951.

MACHINE TOOLS — Supplementary Regulation 2 to Ceiling Price Regulation 30 of the Office of Price Stabilization permits machine tool manufacturers, in determining ceiling prices, to include cost increases resulting from more use of overtime and shift premium labor and subcontracting. SR 2 was effective June 27, 1951.

RETURNABLE CONTAINERS—Supplementary Regulation 9 to Ceiling Price Regulation 22 of the Office of Price Stabilization permits manufacturers who sell products in returnable containers to adjust their ceiling prices to reflect the increased cost of such containers. SR 9 was effective July 2, 1951.

COKE, CHEMICALS, GAS—Amendment 2 of Supplementary Regulation 13 to the General Ceiling Price Regulation extends to midnight of Sept. 30, 1951, the expiration date of the Office of Price Stabilization ceiling price order covering producers of coke, coal chemicals and coke oven gas. Amendment 2 was issued June 29, 1951.

POSTPONEMENTS — Supplementary Regulation 12 to Ceiling Price Regulation 22, and Supplementary Regulation 3 to Ceiling Price Regulation 30 postpone indefinitely the effective dates for placing some specific commodities under CPR 22 and CPR 30. Affected under CPR 22 are numerous commodities but especially metal and plastic products, petroleum derivatives and printing products. The extension under CPR 30 applies only to insulated electrical wire and cable and fabricated structural shapes, plates and related products. The commodities for which extensions are authorized will be placed shortly under new specially designed regulations or handled under supplementary pricing provisions. In the interim, affected manufacturers will continue, if they so elect, to determine ceilings under the General Ceiling Price Regulation. Effective date of CPR 22 and CPR 30 was July 2.

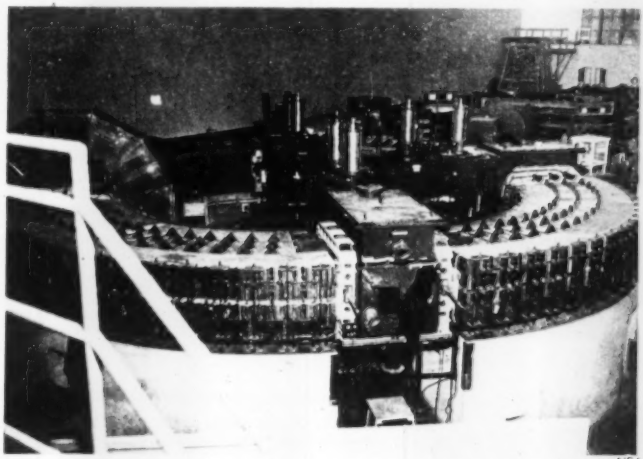
PRICES FROZEN—General Overriding Regulation 13 issued June 30, 1951, and made effective July 1, 1951, by the Office of Price Stabilization froze June 30, 1951, prices of manufacturers covered by the general manufacturers' order (CPR 22) and companion manufacturers' regulations. Filing provisions of these regulations are extended indefinitely. Most of these regulations were to have become effective July 2, 1951, and would have established new ceiling prices based upon pre-Korean levels, plus certain cost increases since then. Price rollbacks were prohibited by the 31-day extension by Congress of the Defense Production Act of 1950.

NPA Delegations

CMP ALLOTMENTS—Amendment of June 30, 1951, of NPA Delegation 1 authorizes the secretary of defense and his designees to make allotments of controlled materials and to apply and assign the right to apply defense ratings and allotment numbers and symbols to meet authorized programs for which the Department of Defense is claimant agency. Delegation 1 already authorized the secretary of defense to assign defense order (DO) ratings in connection with its authorized programs. The new amendment extends the authority to include allotment of controlled materials.

OIL AND GAS—Supplement 1 to NPA Delegation 13 authorizes the Petroleum Administration for Defense to reschedule deliveries of controlled materials for the petroleum and gas industries. Thus, materials can be diverted from one oil company which may not be ready for them to another company which is urgently in need of them. The authority applies only to delivery schedules, not to production. Supplement 1 was effective June 30, 1951.

CONSTRUCTION—Amendment of July 2, 1951, of NPA Delegation 7 adds 20 field offices to the list of those authorized to act on construction applications under NPA Order M-4.



NEA

FACT FINDER: More information about the atom will be provided by this huge synchrotron, being built at California Institute of Technology, Pasadena, Calif., under contract with the Atomic Energy Commission

Windows of Washington

By E. C. KREUTZBERG Washington Editor

Look for a Small Defense Plants Corp. to be set up as a government agency. Its assistance would be available to substantially all of American business

A SMALL DEFENSE Plants Administration is one step nearer reality.

Creation of such an agency was favored by the Senate when it approved the Sparkman amendment in voting to extend the Defense Production Act.

Action on the Sparkman amendment remains to be taken by the House, but it is expected to be favorable inasmuch as its terms have been approved by the House Banking and Currency Committee.

The Small Defense Plants Administration would be similar to the Smaller War Plants Corp. of World War II.

The new agency would encourage small business participation in defense and defense-support programs by means of government loans, technical and managerial assistance. It would have power to book prime contracts and subcontract them to small firms. It would confer with the Defense and other departments on procurement planning with a view to diverting a satisfactory percentage of all procurement to small business. It would make a complete inventory of the productive facilities of small business, and would create an industry advisory committee, composed of small businessmen, for the purposes of consultation. It also would be charged with the task of obtaining for small business a fair share of the available strategic materials.

The administration would be headed by an administrator responsible only to the President, would have its headquarters in Washington and would have branch offices in important cities.

The proposed corporation would be available to substantially all of American business, since it has come to be generally assumed in Congress and the government that all but some 100 to 200 "giant corporations" are small business firms.

Less Hush-Hush . . .

The Defense Department's liberalized policy in regard to releasing procurement information is beginning to be reflected in the Commerce Department's daily Consolidated Synopsis of United States Government Procurement Information. All military procurement offices, instead of only the 55 major ones as before, now are reporting. In addition, the rule calling for an interval of 18 days between publication of the bid information in the synopses and closing the contract is being observed in all but the few cases in which immediate action is needed. Notices of the intent to negotiate specific contracts are beginning to appear in the synopses. And approximate dollar values of contracts are being reported so as to give small firms some idea as to where to seek subcontracts.

The department continues to study the matter and may soon be giving out information about procurements now identified as restricted.

Searching for Substitutes . . .

A Subcommittee on Critical Alloy Substitutes has been appointed by Howard Coonley, chairman of DPA's Conservation Co-ordinating Committee, with the object of easing the pressure on alloying metals.

Membership of the subcommittee: Chairman, E. L. Bearman, United States Navy; James T. Kemp, Department of Interior, and former American Brass Co. metallurgist; Lieut. Col. J. P. Woodlock, United States Air Force; Lieut. Ralph W. Preston, United States Army; Dr. Richard Cole, Munitions Board; E. Hergenroether, assistant director in charge of metallurgy and conservation, Iron and Steel Division, National Production Authority; and John G. Wood, Defense Production Administration, and retired chief engineer, Chevrolet Division of General Motors.

Scrap Imports Favored . . .

Following emergency action by congress, President Truman signed into law an act further suspending duties and import taxes on metal scrap to June 30, 1952. The measure was necessary because demand for both ferrous and nonferrous scrap exceeds supply and makes suspension of duties essential to continued imports, says Rep. Herman P. Eberharter (Dem., Pa.).

UNIVAC UNVEILING: This advanced electronic calculating system—Remington Rand's new universal automatic computer—is delivered by the National Bureau of Standards to the Census Bureau in Philadelphia. Present at the presentation, left to right: James H. Rand, Remington Rand president; Dr. Roy V. Peel, Census Bureau director; Lt. Gen. Leslie R. Groves, Remington Rand vice president; Charles Sawyer, Secretary of Commerce; Dr. Edward U. Condon, director of the National Bureau of Standards; and Albert Greenfield, president of Philadelphia's Chamber of Commerce. Seated is Prof. J. Presper Eckert of Remington Rand, co-inventor of the Univac

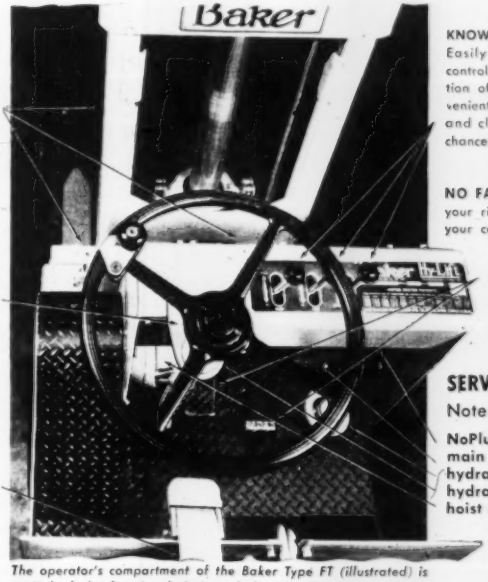
If you can drive an auto— you can drive the NEW BAKER FORK TRUCKS!

The advantages of greater operating convenience and maneuverability of Baker Trucks appeal to management as well as to truck operators. Simplicity of operation means no training period for new drivers. Ease of handling means more work per day. Increased visibility means greater safety and less damage to material handled. Happier operators mean improved employee relations.

SEE WHERE YOU'RE GOING—WHAT YOU'RE DOING! Cut-away design of control compartment, low dash, clean design, nested telescoping uprights, and off-center position of driver mean better visibility, less operator fatigue, more efficient operation and greater safety.

EASY TO STEER! Automotive-type steering wheel turns at a touch. Horn button at center of wheel—like on your car. Wheel is tilted to correct angle for tireless operation. Steering mechanism designed for maximum ease, minimum shock, and most positive control.

SOLID COMFORT! Sponge-rubber padded contour seat and back rest are adjustable to best position for efficient, comfortable operation. Unobstructed entry from either side of truck. Plenty of leg room. Spring action in seat sets brake.



The operator's compartment of the Baker Type FT (illustrated) is typical of the functional design of the new Baker Fork Trucks.

KNOW WHAT YOU'RE DOING! Easily manipulated levers for controlling hoist, tilt, and direction of travel, are located conveniently for operator's right hand and clearly labeled, reducing chance of error.

NO FANCY FOOTWORK! Use your right foot the same as on your car; accelerator pedal adjacent to brake. Foot is removed from accelerator to apply brake—another safety factor. Less footwork because of dynamic braking.

SERVICEMAN'S DREAM!
Note easy accessibility of

NoPlug controller,
main contactors,
hydraulic oil reservoir filler cap,
hydraulic pump,
hoist and tilt motor.

Because of accessibility and careful engineering, the New BAKER Fork Trucks can be serviced in a fraction of the time required for trucks of less advanced design. Compare the following times with the experience of your maintenance department:

Remove Power Axle	60 minutes
Remove Trailing Axle	20 minutes
Reline Brakes	30 minutes

Yours for the asking

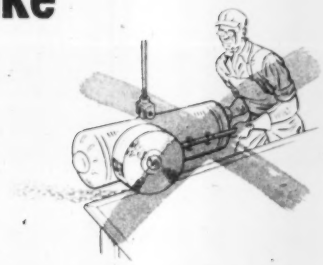
Just off the press — 16-page picture-story manual "CARE and MAINTENANCE OF INDUSTRIAL TRUCKS." Write for your copy today.

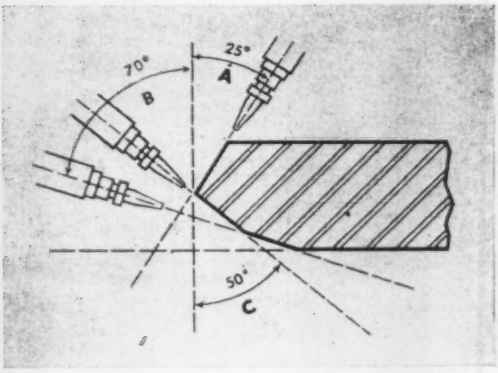
BAKER INDUSTRIAL TRUCK DIVISION
of The Baker-Raulang Company
1259 WEST 80th STREET, CLEVELAND 2, OHIO • *In Canada: Railway and Power Engineering Corp., Ltd.*

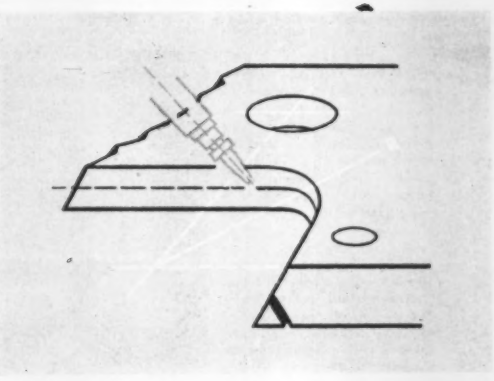
Baker® INDUSTRIAL TRUCKS

No more grinding edges like these on *armor plate!*

Now—the Acetogen Process allows you to *flame-cut* the most difficult bevels on armor plate to *exact tolerance*—and slash the cost of plate-edge preparation by many dollars per ton.







At last, *precision* flame-cutting of armor plate is a reality! Because of its startling accuracy, versatility, and operating characteristics, the Acetogen Process drastically slashes plate-edge preparation costs!

YOU SAVE MAN HOURS! Intricate bevels and cuts need no longer be slowly ground—they can be quickly flame-cut to ±1/16" tolerance.

YOU SAVE CAPITAL INVESTMENT! You don't need large, expensive grinding machines, or elaborate paraphernalia. The Acetogen Process utilizes standard, readily-available, low-cost equipment and tools.

YOU SAVE TRAINING TIME! Experienced flame-cutters become qualified Acetogen operators within a few days. Novices learn quicker, too, because Acetogen gas is docile, easy to use, dependable.

YOU SAVE FLOOR SPACE! You don't need a whole department devoted to grinding. The *complete* job is done in your Acetogen-cutting department.

YOU SAVE HANDLING COSTS! No need to move heavy plates from cutter to grinder; Acetogen does the job in *one* department, and with little moving of plates.

The most convincing proof of these statements comes from some of the nation's top companies—Henry Disston & Sons, Inc.; Baldwin-Lima-Hamilton Corporation; Fitzgibbons Boiler Co., Inc. These companies have continually been amazed at the speed, precision, *and economy* of the Acetogen Process.

Why not put Acetogen to work cutting *your* armor plate? We will act either as consultants, or as sub-contractors doing the entire job in your plant. *We invite your inquiry.* Acetogen Fabricators, Inc., 822 Commercial Trust Bldg., Philadelphia 2, Pa.

YOU GET THESE SPECIAL BENEFITS ONLY WITH THE ACETOGEN PROCESS

- Armor plate of all thicknesses flame-cut to ±1/16" tolerance!
- Acetogen-cut plates are ready for welding without costly grinding, finishing, bridging, or beading!
- Single- and multi-bevels are as easy to flame-cut as square-edges!
- Acetogen-cut plates have "feather" edges . . . surfaces have sufficiently low Brinell to allow machining.

ACETOGEN FABRICATORS, INC. *Originators of precision flame-cutting*

Europe's Import Bill Rises by $3 Billion

Inflation remains a major problem even though West European nations are producing 35 per cent above prewar and have already hit the 1952 production target

THIS YEAR, Europe will have to pay about $3 billion more to obtain even the same volume of imports as in 1950. Even more will have to be paid if inflation continues.

Inflation remains a major problem in Europe, as in the U.S., despite phenomenal industrial progress since the end of World War II.

Up and Up — Between 1947 and 1950, industrial production in Western Europe increased by 45 per cent, to a level 25 per cent above the prewar average, according to a report of the Organization for European Economic Co-operation. During the second half of 1950, output was running at an annual rate some 30 to 35 per cent above prewar, thus hitting the target first set for 1952.

The gains in production made possible an increase of $6.7 billion in exports from 1947 to 1950. Imports increased by only $2.3 billion, and the over-all deficit shrank from $8 billion in 1947 to $1 billion last year. The dollar gap narrowed by a similar amount, but inflation is reversing the trend.

A Jingle in Their Jeans—The gross national product increase between 1947 and 1950 among OEEC nations was an estimated $31 billion, at 1949 prices. After allowance of about $2 billion for unfavorable terms of trade, the OEEC estimates that the remaining $29 billion was used this way: $7 billion to reduce the external deficit, $5 billion to raise the level of gross national investment, $1 billion for increased government expenditures and $16 billion to increase personal consumption.

Besides inflation, OEEC sees these as the major problems facing Western European Nations: Defense expenditures which last year absorbed 33 per cent of government budgets and this year will take even more; shortages of raw materials; insufficiently rapid gains in productivity so that more output can be devoted to defense with a minimum effect on civilian life.

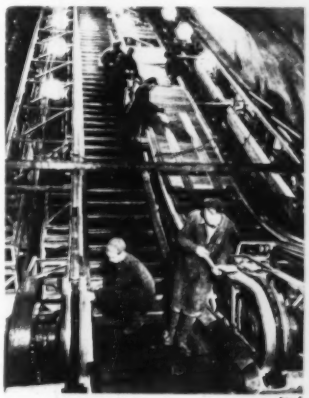
U.K. Expands Steel Controls

The British government has introduced a voluntary system of controls on iron and steel products (except on sheets and tin plate which are already subject to allocation) that will be in effect until about the end of the year when a more formal system will be readied and put in use.

The program is similar to the U. S. system before the Controlled Materials Plan went into effect July 1. Although in Britain the plan is ostensibly "voluntary," it has the effect of being mandatory since most iron and steel production facilities are owned by the government. British companies working on armament orders will be given a Defense Order symbol to get their steel. The DO scheme will be administered by the ministries of Supply and the Admiralty.

The program also includes PT (Preferential Treatment) symbols to be awarded makers of essential civilian products to help them get steel. The PT awards will be limited to 6 or 7 per cent of the total steel available. DO awards take more. Direct and indirect iron and steel exports will not be tightened any further than they are now.

Minister of Supply G. R. Strauss, in connection with controls, wants to move in on the British Iron & Steel Federation, a non-government organization that still controls British Iron & Steel Corp. Ltd. and British Iron & Steel Corp. (Ore) Ltd. which are in charge of purchasing and supplying raw materials for the steel industry, in co-operation with the new state-owned Iron & Steel Corp. of Great Britain. The government wants more voice in the activities of the federation.



FOR RED RIDERS: A new addition to the subway system of Moscow is this modern escalator at the Botanicheskaya station. The Russian capital boasts an excellent subway system. It is built on a circular plan and will cover virtually every part of the city when completed

German Steel Curbs Necessary

The West German government at Bonn is working out a controls program for the German steel industry.

The step is necessitated because most iron and steel plants are sold out for 12 to 15 months in advance. Civilian iron and steel consumers must reckon with a reduction of their allocations by an average of 25 per cent. Complicating the problem is reduced production of coal, and consequently coke. During this third quarter, coal and coke allocations will be cut 15 to 18 per cent.

The steel industry is further hampered by inadequate ore supplies. Lack of shipping has cut imports. Ruhr furnaces got some 385,000 tons of ore from Sweden in January, but those shipments are down to about 170,000 tons a month now.

France May Surpass 1929 Peak

The French in 1951 may surpass the 1929 steel ingot production record of 10.6 million net tons—if they can get enough scrap and coke. Enough iron ore is assured.

First half ingot output was nearly 5 million tons, but that was achieved with coke imported from the U. S. and Germany. Now, a coke shortage of about 250,000 tons threatens. U. S. shipments are falling off, and the Germans want to limit sales of their coke to the French.

Although sufficient ore is available, it has gone up in price; Lorraine ore is now $2.17 per metric ton compared with the former price of $1.88.

Belgian Economy Rides High

The Belgian economy is riding high. Industrial production index is now at about 125 per cent (1936-1938=100), and steel and machinery exports are excellent.

About 440,000 net tons of Belgian steel are going to other countries monthly, mainly the Netherlands. Export prices are terrific; a quotation of $170 per metric ton has ruled some transactions on plates. Average Belgian export prices range from $144 to $150 per metric ton.

So great has been the pressure for steel exports that the government has had to step in to assure adequate steel for the domestic market. Producers have agreed to guarantee to the home consumers a minimum of 198,000 tons a month.

Osborn Story: Brushing Up on Business

Manufacturer of industrial brushes finds the way to boost sales: Product engineering to sell brushing first and Osborn products second

A LITTLE MORE than a decade ago, Osborn Mfg. Co. felt like someone trying to go up on a "down" escalator.

Its power-driven brush business (the company also makes paint brushes, maintenance brushes and foundry moulding machines) was progressing steadily but slowly. The power brush was being increasingly accepted as an essential industrial tool, but there was still a long way to go.

Soul Searching—Executives of the Cleveland company did a lot of reconsidering in that period and came up with decisions that have helped it become the largest maker of power brushes in the world today. Keystone in the new policy was the decision to sell brushing first and Osborn brushes second. That meant establishment of an application engineering department to show potential customers, particularly in the metalworking industry, what brushing can do.

In setting up its engineering department, Osborn realized that it didn't fully know what power brushing can do. R. O. Peterson, manager of the technical department, points out that his men are still learning the ramifications of brushing. He and V. K. Charvat, assistant manager, have this advice for any company starting an application engineering section: Never pose as an expert; start small; and let the program evolve naturally.

Genesis—Osborn started small by working on only those application jobs coming up in customer inquiries. Although there are a lot more of them now, those jobs still account for 80 per cent of the engineering department's activities. The company calls that its reactional approach. Its positive or volitional approach accounts for 20 per cent of the work. The goal now is to transpose those percentages.

The reactional approach usually involves a small, one-shot proposition. The volitional are bigger jobs that may have wide applications in many companies. The fully volitional application is dreamed up by Osborn engineers themselves. The semi-volitional usually results from customer inquiries or tips from salesmen and is more co-operative than reactional.

The Proof of the Pudding—A volitional job just beginning to bear fruit is deburring. Osborn found that many companies were—and still are—removing burrs by laborious hand methods. The engineering department went to work, developed a brush to do the job and designed machinery to operate and to apply properly the power driven brush. First, the idea was sold to one prospect with the object of making any final adjustment or modifications that would be necessary to develop finally the brushing method as a practical factory operation. In the case of gear deburring, that first prospect found that his gear deburring rate went from twenty per man hour to one hundred and eighty per man hour. Another example is a company that had been using a hand method. To assure sufficient production, 15 people—five per shift—had used a hard hand tool to deburr two hundred clutch discs an hour. With power brushing in the plant, three unskilled workers—one per shift—can now turn out six hundred discs per hour. When the job is fully proved, Osborn applies the principles involved to other jobs of similar nature.

In that and all other jobs, Osborn first makes practical tests to find what brushes will do the task. It starts first with its standard power brushes. If none of those work, it tries various modifications of the standard units. If that fails in tests, it begins experimenting with brushes made from new materials or with designs in brushes that use standard materials. Given sufficient time, it usually comes up with a solution.

Power—Next, the application engineers may have to suggest or design the machinery to power the brush. That has proved a knotty problem over the years, one which has evolved the department along a line not originally foreseen. Few machinery builders specialize in brush-using machinery, so Osborn has had to devote some of its application engineering energies to such development. It may design a machine for a job, but tries to get an outside builder to design and make it first. Failing in that, the Osborn company has occasionally built the machine itself. On highly specialized applications, present-day standard equipment can occasionally be satisfactorily adapted for brushing operations. When an outside builder accepts the job, Osborn's only concern is that the builder follow its or satisfactory specifications.

APPLICATION ENGINEERED: CLUTCH DISK GETS AUTOMATIC BRUSHING
. . . output boosted 200 per cent over former hand method

The third phase of application engineering is the actual application done while the first two phases are also going on. Although most of the brush and machinery development goes on at the Osborn laboratories, the practical way to do much of the physical application work is at the plant of the customer.

Men at Work—About 45 people do the brush company's application engineering—one third in testing, one third in machinery design and development and one third in the actual application task. The application man writes a detailed report of the job, including a complete layout for the customer on precisely where the ma-

chinery will be placed and the production per hour.

For every job, the engineers ask themselves these questions:

1. What is to be accomplished:
   a. Clean or remove—what material?
   b. Roughen or smooth — what kind of surface?
   c. Finish or polish—to what degree?
   d. Round corners or blend surfaces—how much?
2. What kind of equipment is needed?
   a. Brushing lathe—what horsepower and speed?
   b. Automatic brushing machine—what type?
   c. Portable or flexible - shaft equipment?
3. What are the properties of the material involved, especially hardness?
4. At what rate and under what conditions must the work be done?

If answers to those questions indicate a technique other than brushing is best, that is reported.

Specialization — For practicality, Osborn finds that its application men must specialize in specific jobs or fields. One man may be the specialist in deburring and centerless finishing. Another man gets all the polishing and buffing jobs. All steel mill-type applications go to another. Two sales trainees learning the business handle routine queries, such as how to brush eggs, put the beads on balloons or clean and polish pecan nuts.

In the more than ten years Osborn has been doing application engineering, it has found that the trick is to stick with the job and have patience. It often takes from nine months to a year between the time a job starts and the time it bears fruit. Occasionally, a project doesn't pan out even after considerable time has been spent on it. However, if a brushing operation is built on sound principles, which with brushes can usually be established easily with simple off-hand tests and with relatively simple set-ups, a successful and efficient operation is practically a matter of course.

Personnel—One problem not yet completely solved by Osborn is the matter of men. For which jobs should it hire young engineering graduates and train them completely itself? For which jobs should it hire technical men already established in industries where it wants to develop applications and teach them the fundamentals of brushing? Osborn uses both methods of recruiting personnel.

Has the application engineering program worked? In about ten years, Osborn has handled more than 5000 application jobs. It's now equipped to do 300 at a time. Some 50 to 100 technical reports are written a month. A successful project handled almost a decade ago now means $50,000 a year to Osborn in brush sales. Most others result in less business than this and a few in more.

TESTING HARDNESS OF WIRE FILL
. . . helps find right brush for job

U.S. To Study German Research

What are the Germans doing in the field of industrial research? Can we derive values from copying their technique and approach?

These questions will be answered this summer when a team representing four leading United States research institutions will go to Germany; they are Battelle Memorial Institute, Columbus, O., Armour Research Foundation, Chicago, Southwest Research Institute, San Antonio, Tex., and Stanford Research Institute, Stanford, Calif.

The trip will be under sponsorship of the Economic Co-operation Administration and at the invitation of the west German government which is eager to get recommendations from the Americans as to how German industrial research may be improved.

Shortage of Engineers Threatens

Some 80,000 engineers are now needed exclusive of military demands, says the Engineering Manpower Commission of Engineers' Joint Council on the basis of a June, 1951, survey of the requirements of 378 companies and government agencies.

When the current graduating class of 38,000 is absorbed, there is still an unfilled demand for 42,000 engineering graduates. But in the 1951 class of engineering graduates, the military through R. O. T. C., reserve programs and the Selective Service system will siphon off about 19,000 graduates. The actual unfilled demand will then be for more than 60,000 engineers.

The manpower commission concludes that the need for engineers cannot be met through the current sources of supply. The 1952 graduating class will be only about 26,000; 1953, 17,000; 1954, 12,000.

The development of atomic energy, antibiotics, jet propulsion and electronics has boosted the ratio of engineers to the working force. The ratio now stands at about 1600 engineers per 100,000 workers.

Research Improves Well Casing

A tougher, stronger steel casing has been developed by research men of National Tube Co. to withstand the tremendous pressure of today's deep oil wells. The casing is now being produced on newly installed equipment at the McKeesport, Pa., facilities of the U. S. Steel subsidiary.

Holes more than 20,000 feet deep are an accomplished fact, and a substantial oil drilling program at depths over 12,000 feet can be expected. To find a casing that would hold up under pressure of deep wells, National Tube started a research program. A quenched and drawn carbon-manganese steel was developed that, in seven-inch outer diameter casing, has a 110,000 pounds a square inch minimum yield strength at 0.6 per cent total strain, 139,000 pounds a square inch average ultimate strength and 22.4 per cent average elongation in two inches.

Cheaper Titanium Claimed

Horizons Inc., Princeton, N. J., and Ferro Inc., Cleveland, have formed Horizons Titanium Corp. to produce titanium by a newly developed process claimed to be cheaper than present methods. The new company will build a pilot plant in Cleveland to carry further the experiments done before in Horizons' laboratories.

Two Join in Titanium Research

Monsanto Chemical Co., St. Louis, and National Research Corp., Cambridge, Mass., have started a joint research venture to develop improved processes for the production of titanium. Work initiated by National Research will be expanded under terms of the agreement and additional activities will be carried on at Monsanto's Dayton, O., facilities.

Another First for...

N-A-X
ALLOY STEELS

The use of N-A-X ALLOY STEEL *in Aircraft Gas Turbines saves up to 50 per cent of critical Stainless Steel.*

Conservation is possible – without sacrifice with use of N-A-X ALLOY STEELS

With the demand for greatly increased quantities of the critical and strategic Stainless Steels used in Jet Engines intensified by the acceleration of the building program, the Air Force requested the producers of these engines to seek *suitable* material with less critical alloy content to replace the Stainless Steel for certain moderate temperature application in these aircraft gas turbines.

The steel selected had to be of low-alloy content with high strength and good welding characteristics. Ordinary low carbon steel did not meet the requirements because of its low tensile properties and the fact that it could not be satisfactorily welded by the inert arc process, which is widely used in aircraft gas turbine manufacture.

The data available from tests made on several weldable low-alloy, high-strength steels indicated that N-A-X ALLOY STEEL was the most satisfactory of the group — *its selection followed.* Unlike other possible substitutes, N-A-X ALLOY STEEL has good low temperature impact values, maintains its higher strength and is not subject to temper brittleness in the wide operating temperature range required of the steel for this purpose — from a low of −70°F. to +800°F.

The use of N-A-X ALLOY STEEL for this application has cut the amount of Stainless Steel required in half. This is of considerable importance to the Air Force.

GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division — Ecorse, Detroit 29, Michigan

NATIONAL STEEL CORPORATION

By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

Threat of unemployment in automotive plants is behind Reuther's scheme to speed machine tool output and thus hasten the transition to more war work in Detroit

DETROIT

"THE MACHINE tool industry is the most serious bottleneck in our defense production." So states Walter Reuther, UAW-CIO president, who has a "Reuther Plan" aimed at eliminating the chokepoint.

It proposes the formation of a separate division within NPA to co-ordinate the program, which involves establishment of central machine tool assembly plants under government control, those plants being fed with parts and subassemblies coming out of privately-owned foundries, forge shops, tool and die and other machining facilities which may be only partially in use at present.

Hasten the Change—The assembly line technique adapted to machine tools, Mr. Reuther believes, can cut the delivery time lag by as much as 50 to 75 per cent. The quicker such tools can be delivered, the less transitional unemployment will be generated by the switch from civilian to defense work, he believes.

As much discussion may be stimulated by this proposal as was aroused by previous Reuther plans. He suggested in 1940 that automobile plants be converted into aircraft assembly facilities. Early in the last war he proposed methods for speeding up war production, and he fastened on the idea of greater standardization and interchangeability of tank engines. Postwar, he was preoccupied with the potentialities of aircraft plants for prefabricated house and freight car manufacture.

Well-Timed — The latest proposal will get close Washington attention. The day it was laid on President Truman's desk couldn't have been better chosen. Anguished protests on Capitol Hill and from the motor capital over the restrictive effects of government edicts on auto production and employment (see below) were creating a stir, which ultimately will lead to a review of the whole defense effort.

Automotive management, as well as labor, is concerned about machine tools. One management move to do something about machine tools has already been taken by Fisher Body Division of General Motors Corp. Fisher Body will build vertical turret lathes and horizontal boring mills, to take some of the load off regular builders.

Auto, Truck Output
U. S. and Canada

	1951	1950
January	645,688	609,878
February	658,918	505,593
March	802,737	610,680
April	680,216	585,705
May	696,039	732,161
June	659,000*	897,853
July		746,801
August		842,335
September		760,847
October		796,010
November		633,874
December		671,622

Week Ended	1951	1950
June 16	157,026	204,704
June 23	158,909	205,334
June 30	157,436	197,767
July 7	107,000*	142,548

Sources: Automobile Manufacturers Association, Ward's Automotive Reports. *Preliminary.

New Senator Investigates

Stirred by the outcry from labor and industry groups against the wave of layoffs threatening the automotive industry this quarter, the New Deal-minded senator from Michigan, Blair Moody, asked for an investigation into government policies with respect to steel allocation. The ex-Washington correspondent of a Detroit newspaper who was appointed to the late Arthur Vandenberg's seat, was named on Monday to head a special subcommittee in the Senate Small Business Committee to check into the situation.

Hearings by Moody's committee will begin in Detroit, probably this week, with Henry Ford II and Walter Reuther to be among the early witnesses. Other Michigan cities may be visited. Sessions in Pittsburgh and Washington are also planned.

Senator Moody in mapping out his committee's line of investigation indicated that they would delve into whether steel is being put away for defense work long before it is actually needed, and whether the defense-supporting programs are getting an unwarrantedly good break in steel allocation.

Furthermore, the senator is interested in complaints that government-required red tape and paper work may be hog-tying manufacturers. "At no time," said the senator, "will this committee champion civilian production or civilian supply of materials against any necessary allocation of material for military production." But he will want to know that military needs are justified.

Unemployment in Detroit?

There is no unanimity in Detroit as to how much unemployment will be caused by the restrictive order on automobile production. The most optimistic forecast is that handed down by the Michigan employment security commission, which believes that only 34,000 will be idle in the Detroit area. The Detroit Board of Commerce estimates 74,000 will be jobless by fall. Less authoritative bodies have set the unemployment total higher than 100,000.

Pessimism over Detroit's conversion problems was touched off, initially, by a Chrysler announcement that it was cutting its work force about 15 per cent, a total of 20,000, of which about 18,500 would be in the Detroit area. Briggs Mfg. Co., as chief body supplier to the corporation, will drop about 8800 employees from its rolls. Other automotive companies are skirting the problem by shutting down for limited periods. Nash takes the first two weeks of July for vacation. Studebaker was also idle last week, resuming today. Several others shut down for a long weekend, starting back to work on July 5.

In all the commotion, it was little noticed that the multitude of supplier organizations are also facing a critical period. And retail and other business establishments in Detroit were laying off a few here and there or failing to hire replacements because of the uncertainties of the next several months.

Question of Auto Output

One of the things certain to be pointed out to Senator Moody's committee when it gets to Detroit is the improbability of passenger car production reaching the 1.2 million figure indirectly established by NPA for the quarter under M-68.

By NPA's own reckoning the "free"

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supply of steel (i.e. that not earmarked for defense and defense-support programs) in the quarter will be less than 3.4 million tons. Of this, assuming the passenger car industry can get all it's entitled to and in sufficient balance, more than 60 per cent would be consumed in making the projected number of cars. A slice of this magnitude from the pool of finished steel reserved for non-preferential consumers cannot be taken by the auto industry without causing a lot of outcry from other would-be consumers.

The handwriting on the wall is beginning to be painfully clear to automakers. It spells out. . .No drastic changes in body and engine design. One of the writers is defense mobilizer Charles E. Wilson, who recently (STEEL, July 2, p. 49) put it this way ". . . . Industry should scrap the idea of new seasonal changes in automobiles. . . or other nondefense items whose 1951 design is plenty good enough." This remark puts an onus on some companies who are too far along in their programs to shelve them completely, and on some who because of public apathy to the present product feel compelled to improve it. The government, which earlier gave its assurance that 1952 model changes would be allowed, has had to backtrack because of the unexpected urgency of machine tool and die tooling needs for defense.

Worse in Canada

In Canada, the automotive industry is in much worse shape, employment and saleswise, than is this country's. The complaints are basically the same — materials shortages and too-tight control of credit. There, however, laid-off autoworkers are getting very little encouragement that an answer can be found. C. D. Howe, defense minister, advises that they should move away from automotive centers to cities which offer other employment. Defense orders have been placed with only two car producers, both developmental contracts.

Michigan Offers Help

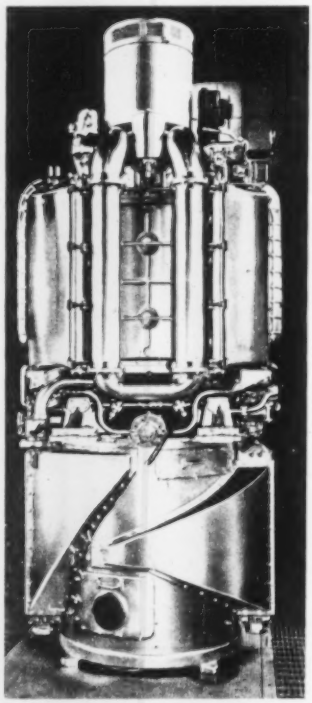
To help Michigan plants participate more easily as defense order subcontractors is the purpose of a survey of facilities being carried out by the state's Department of Economic Development.

Questionnaires were sent to 3600 companies which employ more than eight people. Chambers of commerce are contacting the smaller shops to get maximum coverage in the survey. Listed on punch cards for quick sorting are the equipment which each shop possesses and the products it can make.

FRUEHAUF'S NEW TRAILER FLOOR
. . . permits 500-pound weight saving

New Diesel Unveiled

Cleveland Diesel Engine Division of General Motors has revealed, in part, what is going on in its development program in co-operation with the Navy Bureau of Ships (STEEL, Feb. 12, p. 58). The product of five years' work and $10 million expenditure was unveiled when a radical new submarine diesel was turned over to the Navy. Four of the 16-cylinder engines have been installed in "attack" subs, George W. Codrington, GM vice president and general manager of the division, revealed.



GM'S NEW DIESEL FOR SUBS
. . . has high power-to-weight ratio

Although the horsepower of the new engine is not disclosed, its per-pound production is twice as great as submarine engines used in World War II. Deputy Chief of Buships, Rear Admiral Leggett, said the new engine will give American subs "superior characteristics to any submarine in the world today," and because of the engine's compactness and high power to weight ratio, submarines so equipped will be able to carry a larger load of torpedoes, electronic equipment and fuel.

Fruehauf Redesigns Floor

A new model all-steel van has been placed in production by Fruehauf Trailer Co. Designated FDL, the trailer features a nailable steel floor which permits a 500-pound weight saving over a similar design with conventional wood floor.

Using high tensile steel for the entire framework, the van employs corrugated steel sides, steel front and a galvannealed steel roof assembly. The light weight nailable floor consists of easily replaceable sections with grooves in which a distinct curve in the male and female channel sides clamps a tight hold on nails driven into the channel. Holding power of nails hammered through cargo retainers and into the floor is said to be greater than in wood.

The unit is being produced in closed dry-freight and open-top van types, is built in 20 to 35 ft lengths with capacities of 20,000 and 25,000 lb in the single axle model, or 18,000 lb per axle with tandem axles.

May Auto Exports Soar

May exports of motor vehicles by American producers were at the highest monthly level since 1937 and were nearly double what they were in the same month a year ago, Automobile Manufacturers Association reports. Accounting for 7.4 per cent of total U.S. factory sales, exports totaled 48,306 units.

GM Model Contest Under Way

A display which gives a clue as to what Young America thinks automobiles ought to look like is in progress at General Motors' Detroit headquarters. The Fisher Body Craftsman's Guild, which sponsors the model-building contest, began filling showcases with the entries last week.

THE NEW BRITAIN MACHINE COMPANY

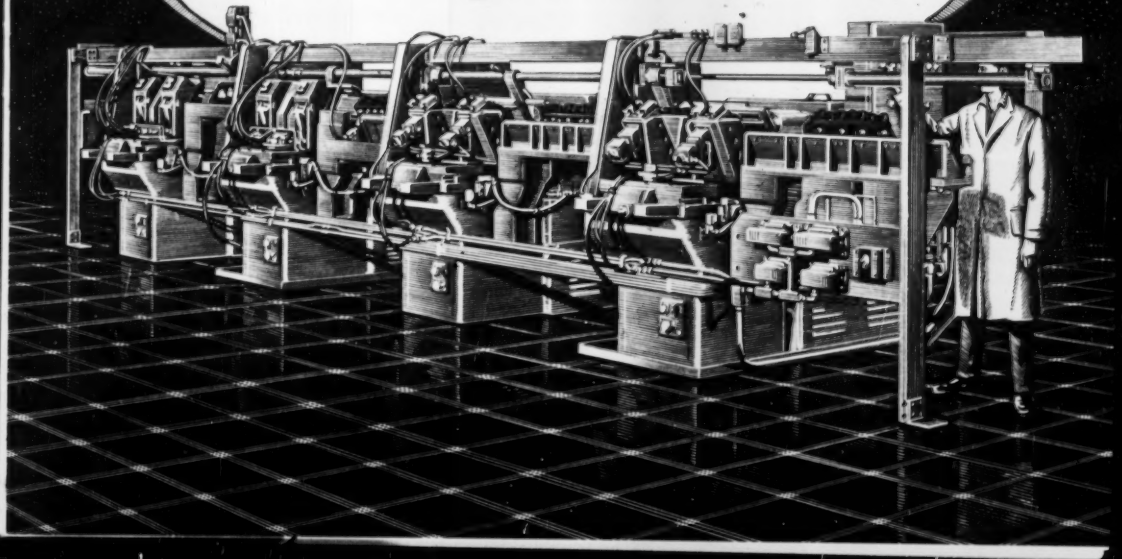
NB

What names come to your mind when you think of progressive manufacturing?

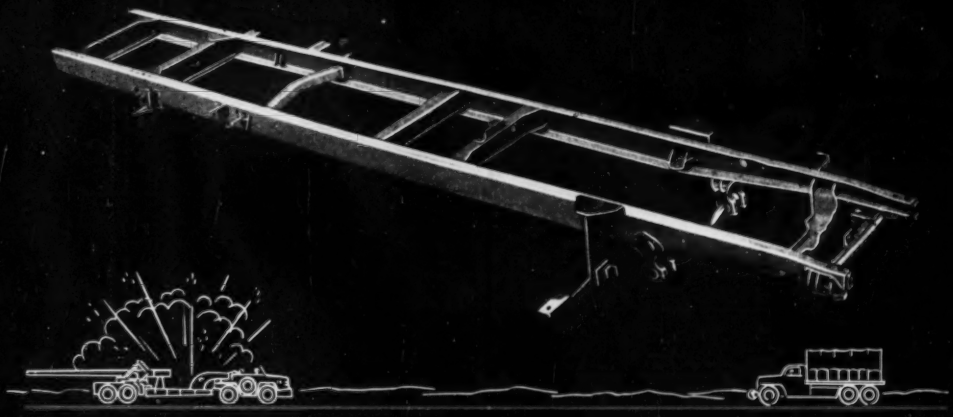
MOST of the ones you think of first have bought New Britain Automatics within the past few years for new and better ways of doing important metalworking jobs. The New Britain-Gridley Machine Division, The New Britain Machine Company, New Britain, Conn.

AUTOMATIC BAR AND CHUCKING MACHINES • PRECISION BORING MACHINES
LUCAS HORIZONTAL BORING, DRILLING AND MILLING MACHINES

NEW BRITAIN
Automatics



Backbone for a Workhorse....



SHARON* HI-TENSILE STEEL INCREASES PAY LOAD OF MILITARY TRUCKS AND BUSES

Pay Load is the big word for both military and civilian vehicles. There's just one reason for the current shift to high tensile - low alloy steel frames for military trucks and buses.

This high strength strip permits lighter sections and with the same power unit increases Pay Load. That means more crew, or more ammunition, or more food, or more of whatever the Pay Load may be.

***Specialists in STAINLESS, ALLOY, COLD ROLLED and COATED Strip Steels.**

SHARON STEEL CORPORATION

Sharon, Pennsylvania

DISTRICT SALES OFFICES: CHICAGO, ILL., CINCINNATI, O., CLEVELAND, O., DAYTON, O., DETROIT, MICH., INDIANAPOLIS, IND., MILWAUKEE, WIS., NEW YORK, N. Y., PHILADELPHIA, PENNA., ROCHESTER, N. Y., LOS ANGELES, CALIF., SAN FRANCISCO, CALIF., MONTREAL, QUE., TORONTO, ONT.

For information on Titanium Developments contact Mallory-Sharon Titanium Corp., Indianapolis 6.

SHARONSTEEL

The Business Trend

Defense program won't be scrapped if fighting ends in Korea but pressure on civilian economy may be eased by allowing more time for the arms job

CEASE-FIRE in Korea won't take the U. S. economy off its semi-war footing. But the jackpot question is: To what degree will the government push its preparedness program after the hot war simmers down?

Between political and economic considerations, there are many possibilities. Under an armed truce, there might be a lessening of the urgency for turning out military goods, though the defense program will by no means be tossed in the nearest waste basket. The big gush of materiel, expected in mid-1952 might be pushed back into 1953, and a temporary lifeline thrown to floundering civilian goods industries. Taxes and controls, now being sniped at by a Congress reluctant to enact unpopular measures before fall elections, could be subjected to radical modifications. The federal budget will undergo closer scrutiny, particularly when the size of the 1951 fiscal year surplus is considered. Wage, price and production controls will be in the Washington limelight for a longer period than now anticipated. But the underlying business current will be much the same: Inexorable diversion of materials into plants producing armaments, tight reign over inflationary factors, continued grand-scale defense spending.

At present there's no sign of foot-dragging on a weekly output basis. STEEL's industrial activity index, for the week ended June 30, matched the mark of the preceding week at 220 per cent of the 1936-1939 average.

There will be no summer hiatus for industry this year, though many consumer lines are being forced to the idea of group vacations and extra layoffs. Normal vacation schedules and such time-outs as last week's observance of Independence Day should prevent setting of any new overall-activity records for the rest of this month and next but the normal summer lull will be hard to find.

Steel Operations Drop . . .

Another week of above-capacity operations was forecast for the steel industry in spite of the holiday. American Iron & Steel Institute reported the week ended July 7 should see output of 2,015,000 net tons of ingots and steel for castings, contrasted with 2,055,000 tons the week before.

Holiday Cuts Auto Output . . .

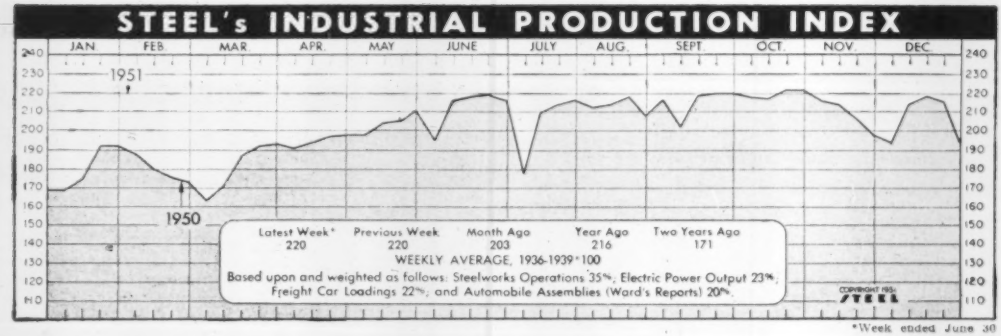
Lower production rates face the automobile industry for the rest of this year but output in the past few weeks is a poor example of what to expect. *Ward's Automotive Reports* estimated output from U. S. and Canadian plants to amount to 157,436 passenger cars and trucks in the week ended June 30. In the previous week 158,909 were assembled; a year ago, turnout was 196,767. Last Wednesday's holiday coupled with such factors as labor, materials and, in some cases, sales difficulties will drop assembly totals considerably and get July off to a poor start. *Ward's* doubts July's first week saw 110,000 units assembled in U. S. plants.

Coal Miners' Vacation . . .

Fuel stockpiling by all types of consumers during the next 90 days is being urged by Defense Mobilizer Wilson—and that program should get a resounding second from coal

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	103.0	103.0	103.0	101.0
	Electric Power Distributed (million kilowatt hours)	6,840	6,835	6,445	6,115
	Bituminous Coal Production (daily av.—1000 tons)	1,838	1,717	1,626	1,758
	Petroleum Production (daily av.—1000 bbl)	6,190	6,192	6,169	5,435
	Construction Volume (ENR—Unit $1,000,000)	$316.7	$207.4	$373.7	$287.6
	Automobile and Truck Output (Ward's—number units)	157,436	158,909	121,476	196,767
	*Dates on request. †Weekly capacities, net tons: 1951, 1,969,035; 1st half 1950, 1,906,268; 2nd half 1950, 1,928,721.				
TRADE	Freight Car Loadings (unit—1000 cars)	825†	833	745	784
	Business Failures (Dun & Bradstreet, number)	170	180	132	156
	Currency in Circulation (in millions of dollars)‡	$27,601	$27,479	$27,461	$27,026
	Department Store Sales (changes from like wk. a yr. ago)‡	+6%	+1%	+3%	+10%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$16,593	$17,830	$11,959	$14,456
	Federal Gross Debt (billions)	$254.4	$254.4	$255.0	$256.5
	Bond Volume, NYSE (millions)	$14.4	$11.8	$10.3	$31.5
	Stocks Sales, NYSE (thousands of shares)	8,724	5,711	4,630	17,099
	Loans and Investments (billions)†	$70.4	$69.5	$69.5	$67.9
	United States Gov't. Obligations Held (millions)††	$31,186	$30,555	$30,382	$36,935
	†Member banks, Federal Reserve System.				
PRICES	STEEL'S Weighted Finished Steel Price Index††	171.92	171.92	171.92	156.69
	STEEL'S Nonferrous Metal Price Index‡	226.0	226.0	241.1	183.5
	All Commodities†	181.1	181.6	182.5	157.4
	Metals and Metal Products†	188.2	188.2	189.4	171.9
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1938=100. ††1935-1939=100.				


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1951
1950
Latest Week* 220
Previous Week 220
Month Ago 203
Year Ago 216
Two Years Ago 171
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
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*Week ended June 30

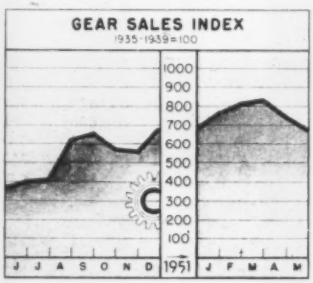
producers. With their stockpiles sky-high and demand lagging, they can use a little governmental sales help. Miners, returning tomorrow after their 10-day contract-dictated vacation, may find their lost production helpful to balance above-ground coal stocks. In their next-to-last week of work before vacationing—the week ended June 23—miners turned out 11,030,000 net tons of bituminous coal.

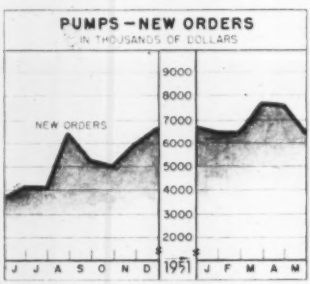
Plant Awards Snap Back . . .

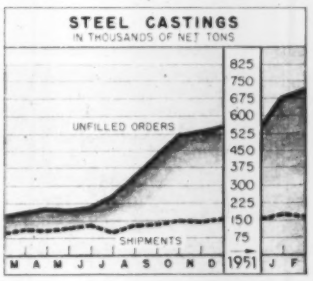
Back on its feet is the awarding of construction contracts, with engineering contracts for the week ended June 28, at $316.7 million. This mark is 13 per cent over the average week to date this year, says *Engineering News-Record*. Industrial buildings led the parade with $100.2 million awarded, well above the $27.2 million volume of the preceding week. Plant awards for the first 26 weeks of the year are 310 per cent higher than last year's first half. Volume for the first half in total contract awards reached $7,282.9 million—up 29 per cent over 1950's same period.

May Business Good . . .

A look at compilations of manufacturers' sales, orders and inventories for May should shed some light on summer operations. Office of Business Economics claims peak rates for manufacturers' shipments in May, while unfilled orders and inventory book values continued to rise. Billings for May deliveries by the nation's manufacturers reached $24.5 billion on a seasonally-adjusted basis, up about 5 per cent in the month. Durable-goods industries sales, at $11 billion, were equal to the March high and about 4 per cent above April. Non-durable goods May sales were up 6 per cent over April. New orders placed with manufacturers during May amounted to $23.2 billion, about 3 per cent less than in April. Backlog of unfilled orders at the be-







Gear Sales Index
1935–1939=100

	1951	1950	1949
January	764.6	280.2	320.7
February	809.1	272.9	282.3
March	830.7	358.4	299.1
April	742.5	328.6	339.0
May	667.1	363.1	250.1
June		401.0	227.8
July		410.7	193.1
August		617.4	262.0
September		654.5	224.9
October		564.8	242.3
November		554.9	230.7
December		680.4	242.8

American Gear Mfrs. Association

Pumps, New Orders
In Thousands of Dollars

	1951	1950	1949
Jan.	6,477	2,586	3,390
Feb.	6,480	2,928	3,247
Mar.	7,644	3,313	3,593
Apr.	7,863	3,376	2,699
May	6,371	3,668	2,775
June		4,153	3,019
July		4,080	3,358
Aug.		6,429	3,767
Sept.		5,191	2,914
Oct.		4,985	2,539
Nov.		5,961	2,525
Dec.		6,720	2,560
Total		53,400	36,386

Hydraulic Institute

Steel Castings
Thousands of Net Tons

	Shipments		Unfilled Orders*	
	1951	1950	1951	1950
Jan.	174.1	89.1	675.4	142.5
Feb.	164.0	91.8	707.0	165.2
Mar.		111.8		185.6
Apr.		107.0		201.6
May		117.9		198.0
June		131.1		206.8
July		98.3		255.4
Aug.		128.4		239.9
Sept.		134.6		428.0
Oct.		149.6		521.8
Nov.		145.9		537.7
Dec.		155.3		554.2

*For sale U. S. Bureau of the Census

Charts—Copyright 1951, STEEL

ginning of June increased by $400 million in a month—the smallest monthly gain since the Korean outbreak. Backlogs of durable-goods makers were up $750 million, while nondurables backlog dropped $300 million. Inventories shown for the first of June continued to swell, as nearly $1 billion was added to book value, raising the total valuation to $38.8 billion. More than two-thirds of the rise was in durables.

Buyers' Future View Dim . . .

A dim view of future business is taken by the National Association of Purchasing Agents. June survey of members discloses a continuing of the softening they found in May. Purchasing agents think the deteriorating back order position (see above) is ominous. Materials shortages, summer vacations, and lack of immediate defense and subcontract business will cause slowdowns in July and August, members predicted. Views on forward commitments are conservative—as they were in June, 1950. Most buying is toward the middle or lower end of a 90-day range.

More Purchasing Power . . .

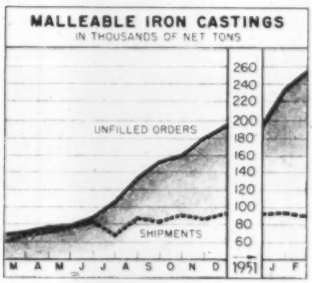
Factory workers' earnings are rising faster than living costs, says the National Industrial Conference Board. Since January, 1950, its price index has risen about 9 per cent, while production workers' weekly earnings have gone up 14 per cent. Straight-time hourly earnings, excluding overtime, are up 10 per cent.

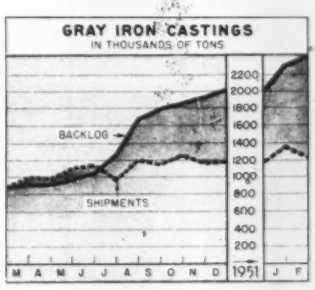
Trends Fore and Aft . . .

Freight carloadings in the third quarter of 1951 are expected to be nearly 3 per cent above those in the same period of 1950. . .Shortage of steel is forcing National Supply Co. to close its Toledo plant till July 16. . . Thompson Products Inc. expects a volume of $200 million this year, with $110 million of it in the second half. . . Stromberg-Carlson Co. will resume full radio-television receiver production next week after a two-month curtailment. . .Business casualties were 9 per cent more numerous in May than they were in April, reaching 775. . .Factory sales of household washers nose-dived in May.

Issue Dates of Other FACTS and FIGURES Published by STEEL:

Construction	June25	Furnaces, W. Air	May28	Ranges, Gas	June4
Durable Goods	July2	Indus. Production	June25	Refrigerators	June18
Employ., Metalwkg.	June18	Ironers	May14	Steel Forgings	July2
Employ., Steel	June25	Machine Tools	July2	Steel Shipments	July2
Fab. Struc. Steel	June4	Prices	June25	Vacuum Cleaners	June4
Foundry Equip.	June18	Purchasing Power	June4	Wages, Metalwkg.	June18
Freight Cars	June18	Radio, TV	June11	Washers	May14
Furnaces, Indus.	July2	Ranges, Elec.	June11	Water Heaters	June25





Malleable Iron Castings
Thousands of Net Tons

	Shipments		Unfilled Orders*	
	1951	1950	1951	1950
Jan.	92.5	62.9	234	62
Feb.	89.9	60.4	255	67
Mar.		66.3		70
Apr.		69.8		76
May		76.2		77
June		82.3		87
July		67.5		105
Aug.		86.0		132
Sept.		82.5		153
Oct.		90.0		160
Nov.		85.2		180
Dec.		91.5		195
Total		926.6		

* For sale. U. S. Bureau of the Census.

Gray Iron Castings
Thousands of Net Tons

	Shipments		Backlogs*	
	1951	1950	1951	1950
Jan.	1,364	913	2,298	914
Feb.	1,234	864	2,392	873
Mar.		996		922
Apr.		981		922
May		1,095		978
June		1,136		1,040
July		961		1,287
Aug.		1,202		1,670
Sept.		1,159		1,794
Oct.		1,255		1,840
Nov.		1,161		1,930
Dec.		1,182		2,012
Total		12,905		

* For sale. U. S. Bureau of the Census.

WILL KEEP YOUR ASSEMBLY LINES AT PEAK CAPACITY

Whatever you manufacture or assemble, you can speed production and improve your product by using Pheoll screws, bolts and nuts. These industrial fasteners drive easy and straight, and will not bind because threads are accurately rolled or machined. Precision-made screw and bolt heads, slots and head recesses prevent wrench and driver slippage. Count, too, the added bonus you receive by using fasteners that improve product appearance.

An interesting story on standard and special industrial fasteners and their profitable applications to your needs may be obtained from experienced Pheoll engineers. Ask these men to recommend screws, bolts and nuts that will increase your overall profits on assembly line work.

these Pheoll products prevent production lag

Tapping Screws • Cap Screws • Sems • Phillips Recessed Head Screws and Bolts • Machine Screws • Special Fasteners • Thread Cutting Screws

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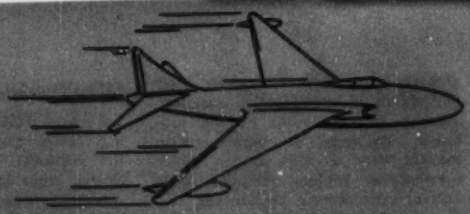
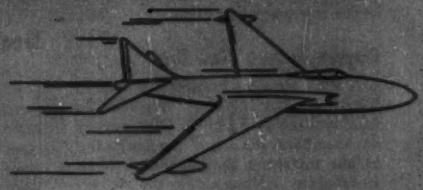
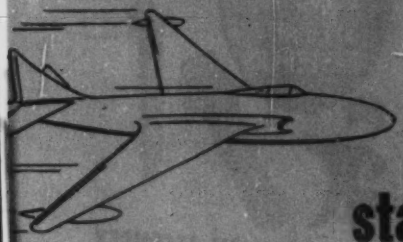
5700 ROOSEVELT ROAD
CHICAGO 50, ILLINOIS
SCREWS • BOLTS • NUTS
Industrial Fasteners and Holding Devices



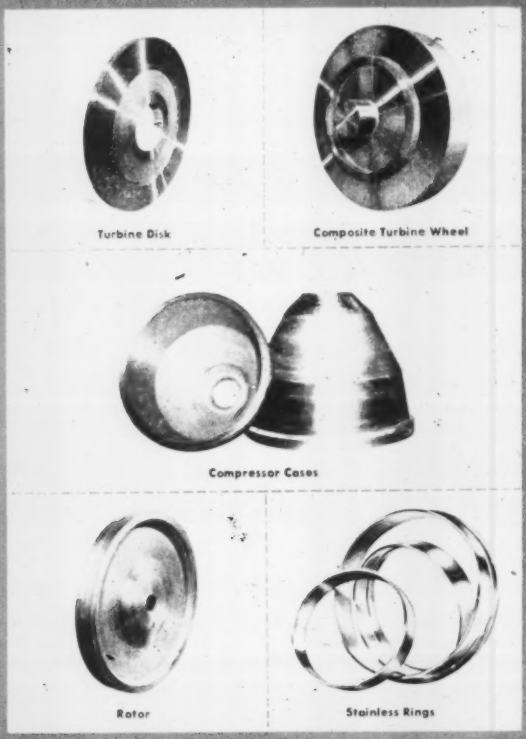
extra stamina for supersonic speeds...





Heppenstall

stainless and high temperature forgings



Jet engine hot spots are tough on parts—yet here, as in other applications, Heppenstall forgings give maximum service. They have the stamina and stability to withstand corrosive gases and vibration stresses at elevated temperatures. The fine grain structure and uniform density of Heppenstall forgings yield a proper balance between ductility and high strength.

When you need corrosive-resistant and high temperature forgings—for unusual durability, strength, or hardness—just call on Heppenstall. Heppenstall Company, Pittsburgh, Detroit, Bridgeport . . . sales offices in other principal cities.

FREE—144-pg. metallurgical data book, *Tensile and Hardness Properties of Carbon and Alloy Steels*. Write Heppenstall Co., Pgh. 1, Pa., for your 8½ x 11" leather-bound copy.

Heppenstall —*The most dependable name in forgings*

Men of Industry

EUGENE J. REARDON
. . . exec. V. P. at Superior Steel

MEL E. MAUER
. . . directs mfg. at Nesco

G. O. LOACH
. . . director and V. P. of Electromet

Eugene J. Reardon, vice president, **Superior Steel Corp.,** Carnegie, Pa., was elected executive vice president. Prior to joining the company in 1945 he was chief engineer of American Steel & Wire Co. in Cleveland.

Laclede-Christy Co., St. Louis, elected **J. Douglas Streett** as president and director. He succeeds **Donald N. Watkins** who has resigned as president, general manager, treasurer and director. **A. B. Agnew** was elected president of Laclede-Christy Co. of Pennsylvania, a subsidiary, and also serves as vice president in charge of operations and director of the parent company. Mr. Streett has been vice president in charge of development of Granite City Steel Co.

Savage-California, Los Angeles, appointed **Cyril R. B. Harding** vice president, manufacturing. He was formerly with Great Lakes Steel Corp.

Howard J. Davis was appointed assistant to the executive vice president, **Colorado Fuel & Iron Corp.,** Denver. He has been assistant to the vice president—sales.

Air Reduction Co. Inc., New York, appointed **S. D. Baumer** vice president of the equipment manufacturing division. He joined Airco's general technical sales department in 1941 as steel mill specialist, was appointed assistant manager of that department in 1944 and manager in 1948.

Whiting Corp., Harvey, Ill., elected **Stevens H. Hammond** chairman of the board. **J. A. Handley** continues as vice president and chief executive officer.

Mel E. Mauer was appointed director of manufacturing operations for **Nesco Inc.,** Chicago. Before joining Nesco he was with Hotpoint Inc. for four years, responsible for all planning and expansion of manufacturing facilities. Prior to that he was with Lockheed Aircraft Co.

E. A. Tranter was appointed comptroller of **Line Material Co.,** Milwaukee. He succeeds **W. S. Pierick,** who left the company recently after serving many years as vice president and treasurer. **G. O. Miller** was appointed to assist Mr. Tranter in the dual role of assistant general comptroller and field comptroller.

L. E. Menns was appointed Pacific Coast sales manager, **Bridgeport Brass Co.,** Bridgeport, Conn. He has served as Los Angeles district manager. He now is in charge of the San Francisco district office and warehouse as well, and will be responsible for the sale of all Bridgeport products on the Coast.

David C. Hall was elected president and general manager, **Diamond Mfg. Co.,** Wyoming, Pa. He was vice president and purchasing agent. **Frank Foster** continues as vice president in charge of production and sales.

Martin J. Holleran was named assistant manager of tool steel sales by **Carpenter Steel Co.,** Reading, Pa. He joined Carpenter in 1946 and served as sales engineer out of the New York mill-branch warehouse.

Lawrence L. Garber, general manger, **American-Fort Pitt Spring Division,** H. K. Porter Co. Inc., Pittsburgh, was elected a vice president.

G. O. Loach was elected director and vice president of **Electro Metallurgical Co. of Canada Ltd.,** Welland, Ont., Canada. He has been connected with sales and technical service activities of the company since 1945. Before joining Electromet he held technical and supervisory positions with several foundries and steel mills.

Douglas J. Donohue was appointed Atlantic district sales manager for **Trumbull Electric Department,** General Electric Co., Plainville, Conn. His office will be in Philadelphia.

Thomas E. Eagan was promoted to research metallurgist by **Cooper-Bessemer Corp.,** Mt. Vernon, O. **W. R. McCracken** is now in charge of the foundry research laboratories in Grove City, Pa., and will also supervise materials control of foundry operations in both the Mt. Vernon and Grove City plants.

C. R. Horton Jr. was appointed manager of the engineering development department of **Dravo Corp.'s** engineering works division, Pittsburgh.

Stephen P. Curtis, chief construction engineer, construction engineering bureau-manufacturing division, **United States Steel Co.,** was assigned as project construction manager in charge of construction of Fairless Works near Morrisville, Pa.

Air Reduction Sales Co., division of Air Reduction Co. Inc., New York, appointed **Walter Goerg Jr.** in charge of business and technical paper advertising. He was in charge of printing production. Mr. Goerg succeeds **William C. Bettes,** who was appoint-

ed advertising manager of Airco Co. International, a division of Air Reduction Co. Inc.

Clearing Machine Corp., Chicago, appointed **Eugene P. Cunningham**, for-

EUGENE P. CUNNINGHAM
Clearing Machine sales manager

merly of its Detroit office, as sales manager succeeding **M. E. Peterson**, who assumes management of the Clearing operations in Joliet, Ill., where a new plant is to be built. **Ervin J. Baumrucker** was named assistant sales manager. **Charles Kauderer** replaces Mr. Cunningham in charge of the Detroit office.

D. V. Lemery was named assistant sales manager, **McCulloch Motors Corp.**, Inglewood, Calif. He formerly was in charge of the Ontario, Canada, office of Lemery's Distributors Ltd.

Robert E. Penney was appointed Pacific Coast district manager, **Crane Co.** He was manager, Los Angeles branch.

Cuno Engineering Corp., Meriden, Conn., appointed: **Carlton H. Winslow**, assistant general manager; **James A. Plummer**, general sales manager; and **Durbin H. Van Vleck**, head of engineering sales department.

A. E. McRae was appointed superintendent of the new gun plant of General Motors Corp.'s **Oldsmobile division**, Lansing, Mich. **Robert T. Rollis** was promoted to superintendent of the pressed metal and plating plant, succeeding Mr. McRae. **Edward C. Gerke** was appointed inspection superintendent of the gun plant and **Arnold I. Hansen**, assistant superintendent under Mr. McRae.

Heading new departments at **Armco Steel Corp.**, Middletown, O., **J. H. Ayres** was appointed manager of pensions and insurance; **E. L. Brooks**, manager of personnel research, continuing with matters involving pay methods and practices; **George M. Hill**, staff supervisor of employment, assisted by **Rowan F. Crawford**; **W. T. Maxwell**, staff supervisor, Armco Drainage & Metal Products Inc., personal relations. **C. M. Allen** was appointed chief safety engineer. **J. G. Purvis** continues as staff supervisor of training.

Electric Metal Makers Guild Inc., Pittsburgh, elected the following officers for the coming year: President, **C. C. Spencer**, Electric Steel Casting Co.; vice president, **J. H. Baldrey**, Allegheny Ludlum Steel Co.; and secretary-treasurer, **C. B. Williams**, Massillon Steel Casting Co.

Loring S. Brock, formerly manager of sales-manufacturing accounts for the Los Angeles office of **Columbia Steel Co.**, U. S. Steel Corp. subsidiary,

LORING S. BROCK
district sales mgr. at Columbia

was appointed manager of sales for the inter-mountain sales district, with headquarters in Salt Lake City, Utah. He is succeeded in Los Angeles by **Burton C. Smith**, a senior technical field representative.

D. V. Sherlock, a director and vice president of **Blaw-Knox Co.**, Pittsburgh, and president of its Union Steel Castings Division, has retired but continues as a director.

Lionel E. Booth is now associated with **Hardinge Co. Inc.**, York Pa. He will direct activities of its Salt Lake City, Utah, office, now being re-established. He also continues his former engineering activities and sale of the Booth flotation machine of Booth Engineers. His offices are at 146 S. W. Temple St., which is also designated as a Hardinge district office.

Harry L. Erlicher, vice president, **General Electric Co.**, Schenectady, N. Y., was named special assistant to Under Secretary of the Army Archibald S. Alexander. Mr. Erlicher will be in charge of Army procurement and production expediting in the office of the Under Secretary.

Robert Schenck, chief metallurgist, **Buick Motor Division**, Flint, Mich., General Motors Corp., and one of the nation's early exponents of the use of boron-treated steel, has retired after 36 years of service. He was a metallurgical engineer at Buick when he became interested in boron steel which uses fewer critical materials. His studies resulted in appointment as supervisor of research at Buick for the National Research Council during World War II. Under his supervision as chief metallurgist Buick adopted high manganese steels for axle shafts and steering gear parts.

Stanley E. Tims was appointed manager of the new plant of **Daystrom Inc.**, Eynon, Pa. He formerly was assistant to the manager of Saco-Lowell Shops, Saco, Me.

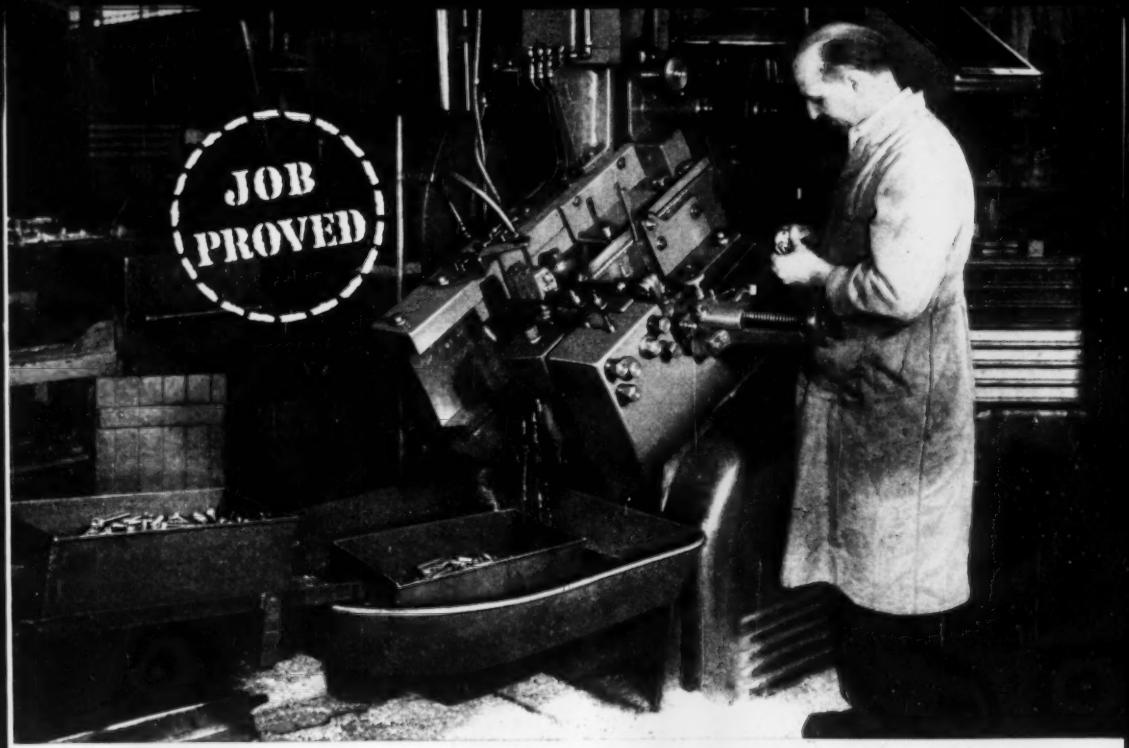
Harry E. O'Grady was appointed purchasing agent of **Ford Motor Co.'s** stamping plant in Buffalo. He succeeds **I. A. Holland**, transferred to a similar post in the company's engine and foundry plant under construction in Cleveland.

Richard W. Sabine, former senior staffman in charge of mechanical goods advertising and sales promotion for **Goodyear Tire & Rubber Co.**, Akron, was named manager of dis-

RICHARD W. SABINE
Goodyear distributor sales

tributor sales in the company's mechanical goods division. He succeeds the late **W. T. Bell**.

J. H. Waterbury was appointed assistant manager, engine division, **Pa-**



SUNTAC ENDS LUBRICATION HEADACHE

Keeps Plant in Full Operation and Reduces Oil Consumption 50%

Cold-rolling threads on cold-headed bolts is a tough operation, and a mighty big financial headache, if the thread-roller does not receive proper lubrication.

Such a condition developed in the plant of a well-known manufacturer of screw machine products. Oil ran out of bearings and would not adhere to the guides for the reciprocating die holder. On several occasions the main bearings overheated and seized up. In each instance four days' downtime resulted, costing a large amount for labor and 30 percent in bolt production. Furthermore, the oil loss became so excessive that maintenance crews actually had to put in extra work to keep floors clean and safe.

In his search for a solution to the problem, this manufacturer called in a Sun representative, who induced him to try Suntac Oil. In the 18 months which have elapsed, there have been no production losses attributable to inadequate lubrication, downtime has been eliminated, and cleanups have been reduced to a routine minimum. The consumption of oil has been cut in half. Savings on oil and maintenance have amounted to more than $3,000.

Suntac Oils are recommended for general lubrication in all machinery where retention of oil in bearings is a problem. These "Job Proved" products cling to the parts to be lubricated. For further information, call or write your nearest Sun Office.

SUN OIL COMPANY • *Philadelphia 3, Pa.*
In Canada: Sun Oil Company, Ltd.
Toronto and Montreal

SUN PETROLEUM PRODUCTS
"JOB PROVED" IN EVERY INDUSTRY

SUNOCO

Reduce Dead-Weight . . . Increase Payload with J&L OTISCOLOY

HI-TENSILE STEEL

J&L STEEL

Operators and builders of transportation equipment are saving deadweight in structural parts with J&L Otiscoloy. The high tensile qualities of this special transportation steel permit weight reduction (as much as 35% in some cases) without loss of strength, because J&L Otiscoloy has twice the yield strength of ordinary mild steel.

By cutting deadweight through the use of Otiscoloy your equipment will be able to carry greater loads, and operate at a lower cost. This means increased income.

In addition, J & L Otiscoloy has these outstanding features that further help to lower maintenance costs

1. **Otiscoloy has 4 to 6 times greater resistance to atmospheric corrosion than mild steel.**

2. **Otiscoloy has greater resistance to fatigue than mild steel.**

3. **Otiscoloy has substantially greater abrasion resistance than mild steel.**

4. **Otiscoloy is easily welded by any of the standard methods.**

5. **Otiscoloy can be readily cold formed.**

No wonder this modern transportation steel is used extensively throughout the industry in reducing deadweight and increasing service life.

JONES & LAUGHLIN STEEL CORPORATION

404 JONES & LAUGHLIN BUILDING PITTSBURGH 30, PA.

From its own raw materials, J&L manufactures a full line of carbon steel products, as well as certain products in OTISCOLOY *and* JALLOY *(hi-tensile steels).*

PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS

JAMES P. STEWART
. . . new president of De Laval

CLAUDE O'MALEY
. . . V. P. Moto-Mower, Richmond plant

ARTHUR J. WILLIAMSON
. . . V. P.-mfg., Tube Reducing

cific Airmotive Corp., Burbank, Calif.

De Laval Steam Turbine Co., Trenton, N. J., elected **James P. Stewart** president. He previously served as executive vice president. **Wencel A. Neumann Jr.** was elected vice president of industrial sales; **H. B. Bauer**, vice president of engineering, continuing as manager of marine sales; and **Charles A. Jurgensen**, vice president of manufacturing, continuing as works manager.

Gordon Groth was appointed executive vice president, **Erie Resistor Corp.**, Erie, Pa. He formerly was president of Electra Mfg. Co. in Kansas City, Mo.

Federated Metals Division, American Smelting & Refining Co., appointed **A. E. Buchanan** as sales representative to cover North and South Carolina, the eastern half of Georgia and most of the western part of Florida. His territory is under the jurisdiction of Federated's Baltimore office.

National Association of Fan Manufacturers elected **John M. Frank** president for the ensuing year. Mr. Frank is president of Ilg Electric Ventilating Co., Chicago.

Moto-Mower Co., Detroit, elected three new vice presidents: **Claude O'Maley** will be in charge of manufacture at the Richmond, Ind., plant; **John S. Slick** is vice president-operations and comptroller; and **Renville Wheat** is vice president, secretary and legal counsel. Mr. O'Maley has been with the company since 1945 and associated with the lawn mower industry for many years. Mr. Slick was formerly vice president and treasurer of Graham-Paige and secretary of Kaiser-Frazer Corp. Mr. Wheat is of the legal firm, Dykema, Jones & Wheat.

Robert M. Lundgren was appointed vice president, **Kuljian Corp.**, Philadelphia. He will have charge of Kuljian's sales programs.

George M. Streicher, vice president-manufacturing, was promoted to general assistant to the president of **Monroe Auto Equipment Co.**, Detroit. **Leo J. Fairchild** was made general production manager; **Walter Phelan**, planning manager; and **Herb Olt**, central estimating.

Forest H. Humphreys was appointed manager, property department, **American Car & Foundry Co.**, New York. He succeeds **John H. Green.**

Arthur J. Williamson was appointed vice president in charge of manufacturing operations, **Tube Reducing Corp.**, Wallington, N. J. For the last 13 years he has been with Summerill Tubing Co.

Raymond C. Freeman was named manager of **General Electric Co.'s** welding divisions at Fitchburg, Mass. **Alanson U. Welch** succeeds Mr. Freeman as manager of engineering for the divisions. **Alfred F. Fields** was named manager of mold manufacture, plastics division, chemical department, Pittsfield, Mass., to succeed **G. Arthur Gustafson**, temporarily assigned to the post in addition to his duties as manufacturing and materials engineer. **W. R. Burrows** and **R. E. Coutant** were made assistants to the managers of engineering and sales, respectively, in the aeronautic and ordnance systems divisions of the company.

William J. Muller was appointed export manager for **Southern Alkali Corp.**, subsidiary of Pittsburgh Plate Glass Co., Pittsburgh. Before joining Southern Alkali he was treasurer of U. S. Alkali Export Association Inc. His headquarters will be at 30 Rockefeller Plaza, New York.

OBITUARIES . . .

W. D. Falkenstein, 56, Pittsburgh district manager, **Electric Controller & Mfg. Co.**, Cleveland, died June 21.

Abraham Newman, 66, president of **A. Newman & Co.**, St. Catharines, Ont., Canada, died June 27.

John Wilkinson, 83, inventor of the air-cooled engine and numerous improvements on automobile motors, died June 25 at his home in Syracuse, N. Y. He was chief engineer and vice president of **H. H. Franklin Mfg. Co.**, Syracuse, until he retired in 1926.

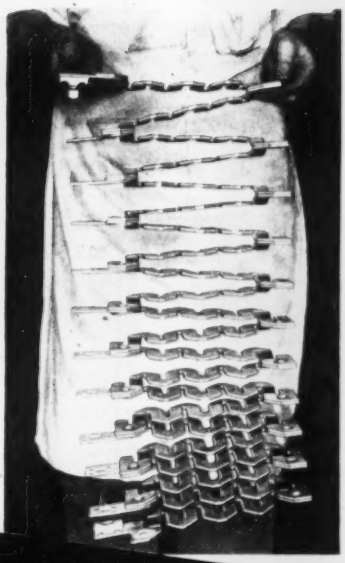
Henry R. Turner, 51, a special engineer at the Lackawanna, N. Y., plant of **Bethlehem Steel Co.**, died June 24. He formerly served as general superintendent of the mechanical division at the Lackawanna plant and in 1949 was named special engineer.

William B. Brendlinger, 72, sales manager, **Ingersoll-Rand Co.**, Philadelphia, died June 26. He was with the company 50 years.

Michael Martinek, 67, founder and owner of **Western Wire & Iron Works Inc.**, Chicago, died June 27 while on a business trip in Binghamton, N. Y.

NO BURNING

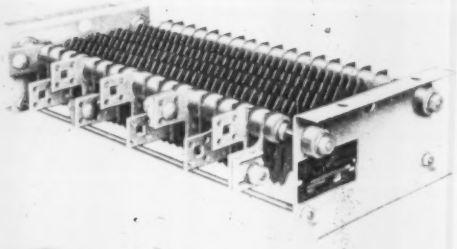
at Grid-eyes or at Tap-plates



Less Up-Keep with

TRADE MARK
EC&M TAB-WELD PLATE RESISTOR
PATENT NO. 2,378,059

Resistors get little attention, because they are usually mounted overhead or in similar hard-to-reach locations. Clamping-nut pressure slackens under alternate heating and cooling. Formerly, under the reduced pressure, OHMIC value changed, burning occurred and often was *not* noticed until damage took its toll.



But—note how resistor troubles are now eliminated in the EC&M TAB-WELD design! The current-carrying path is continuous and is *independent* of end clamping-nut pressure. Convenient tap-plates simplify tap-shifting—make possible small adjustments in resistance value, because plates are closely spaced. Also, these alloy-steel resistors are corrosion-resisting—and have negligible resistance-change between cold and maximum working temperatures.

SPECIFY EC&M BULLETIN 942-A TAB-WELD PLATE RESISTORS FOR CRANE AND MILL AUXILIARY CONTROL

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET • CLEVELAND 4, OHIO

Production AND Engineering
NEWS AT A GLANCE

LATEST ON CARTRIDGE CASES—Low-carbon autobody stock has been proved a suitable material for cartridge cases used in low power weapons like howitzers, and medium-carbon heat treated steel, WD-1030, is satisfactory for cases in all other weapons now under consideration. The Army and Navy have joined hands in furthering the development and standardization of steel cases, placing some contracts and setting up standby plants. Most cases are fabricated by a combination of drawing and extrusion, contributing to conservation of material. Newer types, like those for recoilless rifles, call for specialized techniques. One involves rolling up a preperforated sheet to cylindrical shape, welding the seam and welding on the head piece. —p. 72

ANOTHER TITANIUM PROJECT— New system for titanium reduction has been perfected by an eastern research organization which has organized a company capitalized at around $1 million for undertaking the work on a production scale, envisaging costs of something under $1 per pound, comparing with present cost of $5 per pound for titanium sponge. A large steel fabricating interest has invested funds in the venture and plans are under way for a pilot plant for which equipment has been ordered. Initial production is six months to a year away. The project is staffed by experienced engineers and metallurgists, making it anything but a fanciful promotion scheme.

PRACTICAL FOUNDRY TRAINING— Largest and most completely mechanized research foundry in the world is going up at General Motors' new research center just outside of Detroit. The installation will cost $1.2 million, has two primary purposes—improved foundry processes and development of trained foundrymen. Final stage of construction will be completed this year and the entire unit will be manned by college graduates. Average age of the first group to be hired was 25; full staff will be about 65 persons. The research unit will be able to produce experimental castings in practically the entire size and weight range covered by GM's 13 production foundries in the U.S. and Canada.

DESCALING REVERSION—Tightening of sulphuric acid supplies and difficulties encountered in reclaiming or disposing of spent pickling liquor are persuading some wire drawers to turn back to the 20-year old (or more) process of mechanical descaling of rods. It involves little more than flexing the rod through two sets of rolls, vertical and horizontal, before it enters the first die of the wire machine, the rolls being driven by the rod. Small amounts of scale still adhering can be scoured off by wire brushes driven from the straightening rolls, or by working out an arrangement for giving the rod a slight stretch between the rolls and the die. Some veterans in the trade think the cold working effect of mechanical descaling gives a better rod than the pickled variety, the latter of course always being subject to hydrogen embrittlement.

FINE FILTERING—An absolute air filter, developed originally for the Atomic Energy Commission and capable of removing better than 99.98 per cent of all dust, smoke, fumes, radioactive particles, spores and other microscopic foreign matter from air, is now in quantity production for commercial use. Filtering material is a soft, felt-like paper made of specially treated pulp and containing very fine asbestos fibers. The paper is folded and packed into the filter in an accordion pleat arrangement to provide an extensive filtering area within a small space. Two sizes are made, both 24 inches square and one 5⅞ inches, the other 11½ inches deep.

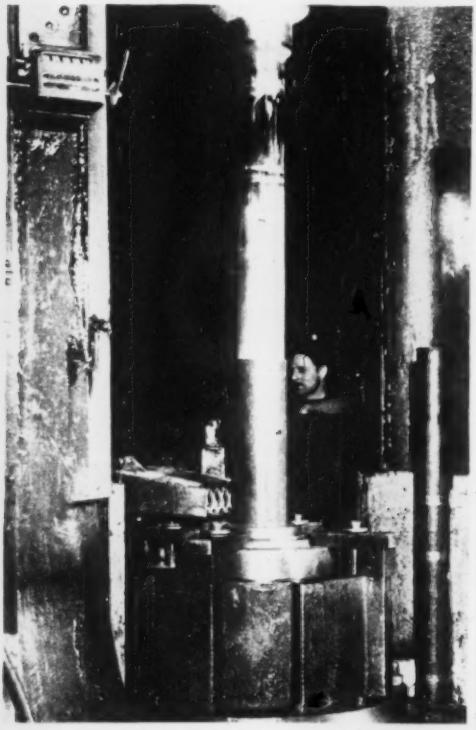
SOUNDING OFF—Ultrasonic testing is being used on blooms rolled from ingots of high-quality steel to indicate how far segregation and piping extend down from the top. No two ingots are the same in this respect, and any rule-of-thumb such as cropping 10 per cent from each bloom may be wasteful in one case, unsafe in another. Ultrasonic equipment will indicate the exact degree of cropping that should be done.

PROBING SEGREGATES—Continuous analysis of the variation in content across a steel segregate has been made by means of the spectrograph, using a highly localized condensed spark and a moving photographic plate. In such fashion a spectrogram was obtained on which the spectral lines vary in density over their length according to local changes in composition of the specimen along the path of the spark. Traverses were on the order of 2 centimeters. —p. 78

TECHNOLO-GISTS: Stocking-out washed iron ore at a rate up to 600 long tons an hour is possible with new types of conveyor belt stackers of the traveling type (p. 96) . . . Handling of large stampings between press operations is facilitated by iron hand devices for which several different types of grippers have been devised (p. 84) . . . Savings of 30-40 per cent in normal machining time have been realized with machine parts of Meehanite metal cast by the shell molding process (p. 82) . . . Sixth installment of STEEL's comprehensive series on cold rolling of strip steel (p. 86) deals with practical problems like wavy edges, weld breakage, particle pickup, mill vibration and skidding. *A.H.A.*

Metalworking Outlook—p. 35 *Market Outlook—p. 127*

Blanking operation (above) is the first step in drawing steel cartridge cases by the disk and cup method. Sheared strips from steel plate are shown here being fed into blanking die at Norris-Thermador Corp. Below is the drawing operation, with punch entering mouth of drawn case set in nest ring on top of die



Extruded and Drawn

Steel Cartridge

Two prime factors—availability of material and superior physical properties of the finished cases—are combined in the joint Army-Navy efforts to perfect techniques for mass-producing artillery components from low and medium carbon steel. Sizes range from 20mm to 155mm

By W. F. STEVENSON
Civilian Chief
Ammunition Branch, Industrial Division,
Office, Chief of Ordnance

IN ANY future emergency artillery cartridge cases must be fabricated from steel. The copper and zinc required for cartridge brass will not be available in sufficient quantity. Further, new weapons and rounds under development require physical properties in the cartridge case decidedly beyond the range possible in the brass alloys, but well within the range of steel.

The technology of steel cartridge case manufacture is highly involved and difficult compared with fabrication from brass. It requires trained metallurgists and engineers for supervision and direction to a much greater extent than would be required for brass fabrication. The actual manufacturing operations require that operators and supervisors be thoroughly trained and skilled in the art of deep drawing of steel.

The heat treatment, when required, is of particular importance and needs constant vigilance to insure that once properly established it is rigidly controlled against any variations. This also requires uniformity in the steel as regards its chemical composition and other characteristics that may affect hardenability. Each heat of steel must be examined and the heat treatment cycle changed as required.

Performance Superior—Cartridge cases fabricated from steel should be decidedly superior in performance to cases of the same type fabricated from brass. Very little can be accomplished in the way of increasing the physical properties of brass cartridge cases by a change in chemical composition even though copper and zinc were available. For steel cartridge cases it has been demonstrated that non-heat treated low carbon steel, WD-1010 or auto body stock will be satisfactory for those required for low power weapons such as the 75mm and 105mm howitzers and that heat treated medium carbon steel, WD-1030, will be satisfactory for all other weapons now under consideration. Much higher physical properties (if needed) are attainable through the use of heat treated alloy steels. Such steels can be extruded and drawn with little more difficulty than straight carbon steels.

The steel must be of good quality, well killed, uni-

Cases Advance Toward Standardization

form and relatively free of nonmetallic inclusions. Standard specifications are available for the steel for the conventional cup and draw method from disk and tentative specifications have been prepared for the steel to be used in cold extrusion.

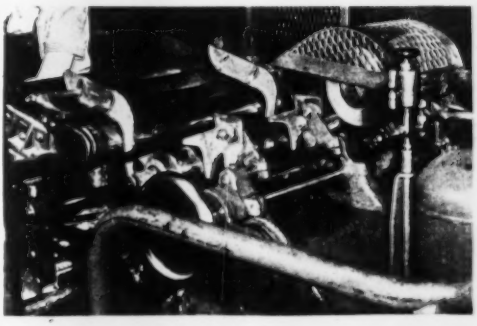
Brass has the tendency to season cracking or age hardening—not suffered by steel. This can be overcome to a great extent by stress relieving or low temperature annealing. However, fired brass cartridge cases, unless cleaned very shortly after firing cannot be resized and reused because they will crack and split, apparently on account of the severe corrosive action caused by the residue in the gases from our FNH powders. Steel cartridge cases fairly badly pitted from deliberately caused corrosion can be successfully resized and reused.

Joint Army-Navy Attack—It is not possible simply to substitute steel for brass in a cartridge case line. That was tried during the past war when attempts to fabricate cartridge cases from steel on a production basis were only sporadically successful. The technical difficulties encountered in wholesale transfer of fabrication to steel are fully recognized. Consequently each cartridge case is considered as a separate problem.

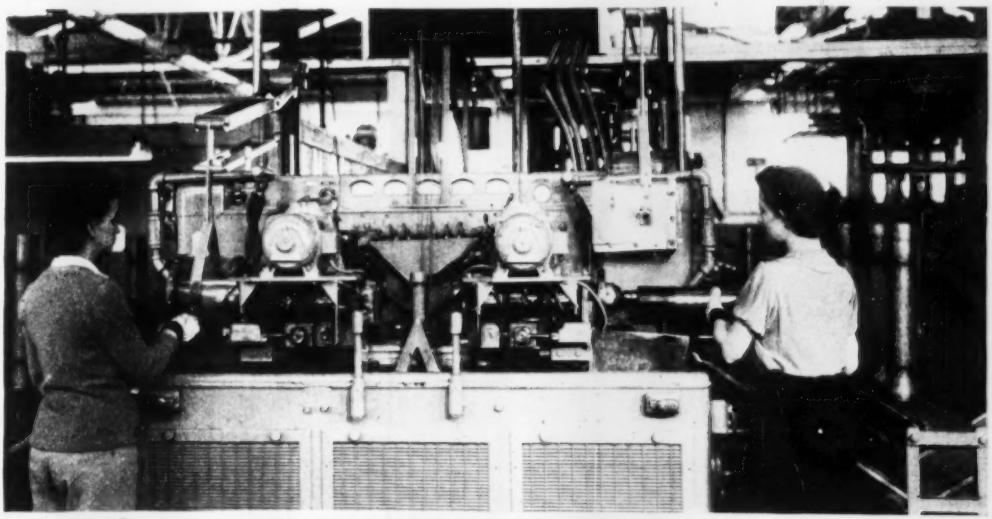
Because manufacture of steel cartridge cases is inherently difficult, the problems involved are being jointly attacked by the Navy Bureau of Ordnance and the American Ordnance Association cartridge case committee.

Specification requirements, including methods of

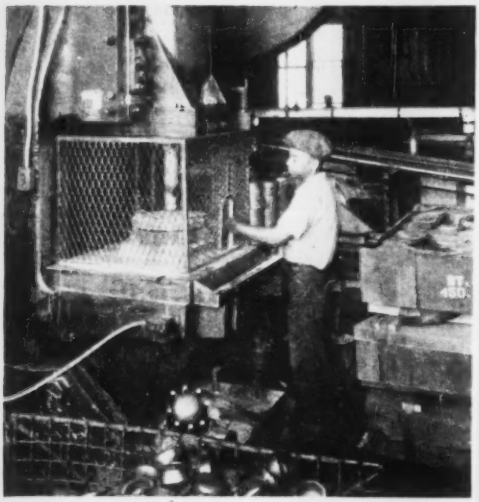
ALTHOUGH Ordnance's General Davis recently characterized the steel cartridge case program of the last war "a complete flop", research and development has been carried forward since then to the point where now both Army and Navy are gradually standardizing on steel cases in all sizes from 20-mm up to 155-mm.



Rotary trimming machine (above) provides an even rim essential for tapering, also at Norris-Thermador. Below is induction heat treating equipment with two stations for heating and quenching the lower sidewall of steel cases



Steel cartridge cases are inspected visually for defects, particularly in the protective surface coating, at the Norris plant

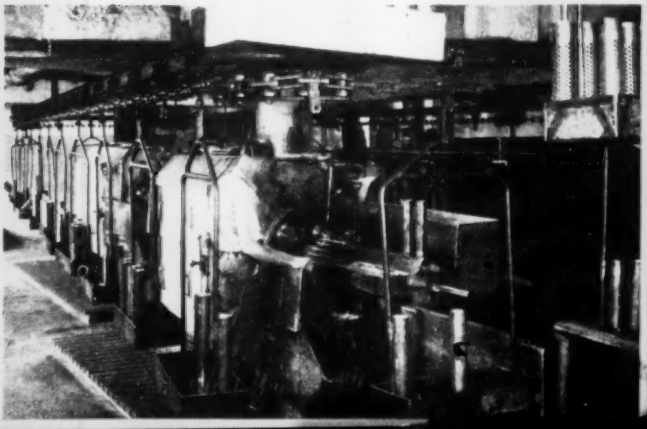


testing, number of test samples, lot sizes, testing equipment, etc., will be as much alike for the two services as requirements in end product will permit. Close similarity will be helpful and will save confusion or adverse criticism on the part of contractors who may be shared by both services. Also, close similarity will simplify the training of Army and Navy inspectors.

Even the method of dimensioning drawings is being brought into close similarity wherever feasible. There had been a basic difference in the method of dimensioning tapered surfaces and the Army method has been adopted by the Navy.

Standby Plants Established—A further example of

Following illustrations show manufacture of 57-mm steel cases at Frankford Arsenal. To the left is the precup operation, starting from steel disks; lower left is the heading operation, and directly below is shown rough turning the head



this co-ordinated action and policy is the establishment of joint Army-Navy steel cartridge case standby plants. The Ordnance Corps of the Army has standby plants for the production of artillery projectiles, bomb bodies, powder, high explosives and loading. The Navy Bureau of Ordnance has one standby plant for the manufacture of 40mm steel cartridge cases. This situation led the Chief of the Bureau of Ordnance, slightly over two years ago, to propose that his bureau and Army Ordnance budget for the establishment of a joint Army and Navy standby plant, primarily for the production of the Army 90mm and 105mm steel cartridge cases and for the Navy 3-inch and 5-inch steel cartridge cases. This plant should be in operation in the fall of this year.

Establishment of this standby plant is conservatively estimated to gain a minimum of at least one year's invaluable lead time. This joint facility will permit a vital flexibility in the control and adjustment of steel cartridge case manufacturing schedules. Necessary adjustments or cutbacks in the production of individual items may be accomplished without the permanent loss of highly skilled, thoroughly trained operators, so essential to steel cartridge case manufacture. Except for the standby 40mm case shop of the Navy in Detroit and the plant of Norris-Thermador Corp., (formerly Norris Stamping & Mfg. Co.) Los Angeles and the Fulton Sylphon Co. in Knoxville, Tenn., the limited capacity of Frankford Arsenal and the Naval Gun Factory in Washington, neither service has a facility for the war manufacture of artillery steel cartridge cases.

The Naval Ordnance Plant at Louisville was selected as the site for this standby plant. Consideration of these factors was involved in the selection of the site:

(1) That there be a minimum investment in real estate so as to allow concentration on valuable equipment and its installation.

(2) That the site be convenient to a source of steel and, since cartridge cases are bulky to ship, the plant must also be suitably located with respect to the loading plants that will use the cases.

(3) That the selection of a desirable contractor-operator (wartime) be combined with the final choice of the site.

Louisville location seems to meet all these factors. It has plenty of space and is adequately suited in the way of power requirements; a very well equipped tool room and gage laboratory are available. Potential operator of the plant, is Clayton-Lambert Co., operator of the World War II Navy plant for manufacturing 40mm steel cartridge cases.

Norris Gets the Contract—Contract for the engineering work, the procurement and installation of equipment was let by the Navy to Norris-Thermador Corp. That company was the outstanding producer of steel cartridge cases during World War II and has been the only commercial facility for steel cartridge cases for Army and Navy procurement since that time.

The contract covering the installation of equipment for steel cartridge case manufacture at the standby Army-Navy plant does not cover the development of suitable manufacturing methods. It presupposes that suitable methods have been established—that descriptions of manufacture will be available.

To meet this requirement, Army Ordnance has taken the following action:

(1) An industrial mobilization study was contracted with Norris for the development of a method of manufacturing the 90mm steel cartridge case.

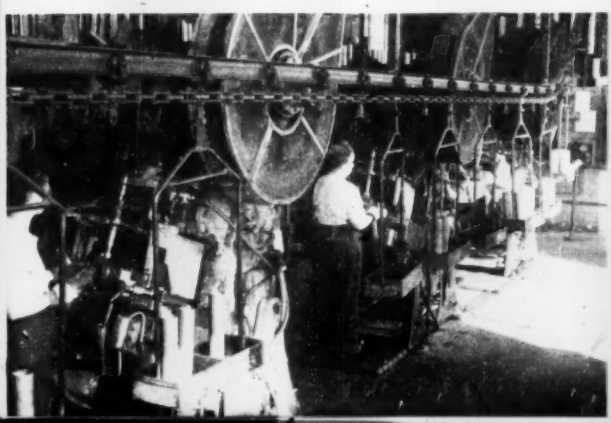
(2) Contracts were negotiated with that same company to develop the 75mm skysweeper and 76mm tank gun cartridge cases from steel.

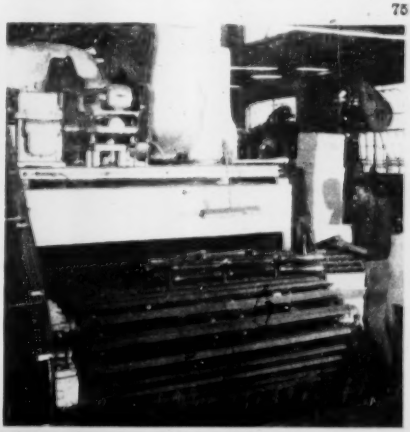
(3) Frankford Arsenal will develop the 120mm steel cartridge case.

(4) Similar work has been initiated to cover the steel cartridge case for the 105mm howitzer. That case was successfully produced during the war and much manufacturing data on it are available. Only minor work remains to prove the process which was most satisfactory during the war and to incorporate the developments of investigations that have been made since then.

This standby plant will be laid out and equipped to make steel cases by the disk and cup method with provision for cold extrusion from bar with the least

Perforating operation on steel case for recoilless rifle projectile is shown below, as handled at Frankford, while at the lower right cases are being removed from an oven used for baking the phenolic varnish finish, reading for stenciling and packing

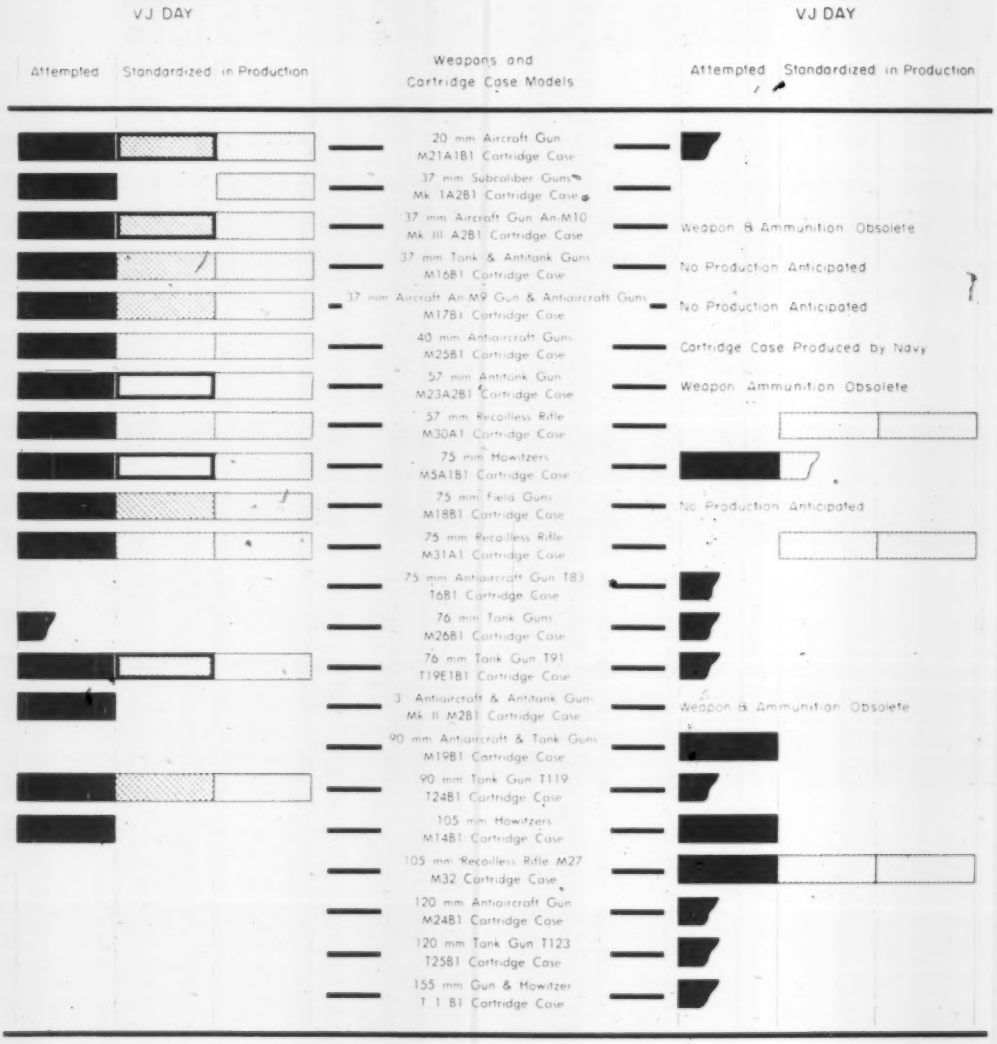




change-over, when that method has been adopted.

Installation Costs High—Another and larger joint plant in a different geographical location is currently under consideration. Also under consideration is the establishment of an Army steel cartridge case stand-by plant. This latter was decided under the policy that it would be more economical to have a case plant in government real estate. The cost of installation of the heavy presses is about 20 per cent of the cost of the presses themselves. If installed in private industry eventually the (*Please turn to Page* 98)

Chart showing status of the various steel cartridge case programs


BEFORE
VJ DAY
AFTER
VJ DAY
Attempted
Standardized in Production
Weapons and Cartridge Case Models
Attempted
Standardized in Production
20 mm Aircraft Gun M21A1B1 Cartridge Case
37 mm Subcaliber Guns Mk 1A2B1 Cartridge Case
37 mm Aircraft Gun An-M10 Mk III A2B1 Cartridge Case
Weapon & Ammunition Obsolete
37 mm Tank & Antitank Guns M16B1 Cartridge Case
No Production Anticipated
37 mm Aircraft An-M9 Gun & Antiaircraft Guns M17B1 Cartridge Case
No Production Anticipated
40 mm Antiaircraft Guns M25B1 Cartridge Case
Cartridge Case Produced by Navy
57 mm Antitank Gun M23A2B1 Cartridge Case
Weapon Ammunition Obsolete
57 mm Recoilless Rifle M30A1 Cartridge Case
75 mm Howitzers M5A1B1 Cartridge Case
75 mm Field Guns M18B1 Cartridge Case
No Production Anticipated
75 mm Recoilless Rifle M31A1 Cartridge Case
75 mm Antiaircraft Gun T83 T6B1 Cartridge Case
76 mm Tank Guns M26B1 Cartridge Case
76 mm Tank Gun T91 T19E1B1 Cartridge Case
3" Antiaircraft & Antitank Guns Mk II M28B1 Cartridge Case
Weapon & Ammunition Obsolete
90 mm Antiaircraft & Tank Guns M19B1 Cartridge Case
90 mm Tank Gun T119 T24B1 Cartridge Case
105 mm Howitzers M14B1 Cartridge Case
105 mm Recoilless Rifle M27 M32 Cartridge Case
120 mm Antiaircraft Gun M24B1 Cartridge Case
120 mm Tank Gun T123 T25B1 Cartridge Case
155 mm Gun & Howitzer T 1 B1 Cartridge Case
Legend
Serious Effort Made Including Mfg & Testing of Experimental Lots
Study of Manufacturing Method Planned or in Process
Fully Standard
Substitute or Limited Standard
All Stocks Subsequently Made Obsolete
Fully Standard, Later Weapon & Ammunition Obsoleted
Standardization in Process
All Stocks Subsequently Made Obsolete Although Never Standardized
Quantity Production Passing Ordnance Specifications

By GUY HUBBARD
Machine Tool Editor

Seen and Heard in

The Machinery Field

BALL BEARING SLIDES: Among significant innovations in reciprocating slides on machine tools, are those which roll on ball bearings. An example of their successful use is in surface grinder design—particularly in work tables and elevating mechanisms where sensitive "feel" is desirable.

While these grinder slides generally follow the pattern of the familiar roll carriage on typewriters, other machine tools now incorporate cylindrical multirow ball cages in conjunction with cylindrical bar ways. It is interesting to note that cylindrical ways —which went into eclipse following wide use on early machine tools—have staged quite a comeback of late.

Slides always have represented trouble areas in machine tools. Plain slides sometimes bind and wear excessively when tightly fitted. On the other hand, when loosely fitted, they become unduly cushioned by oil films and this disturbs machining accuracy.

Properly designed and accurately constructed ball bearing slides can be preloaded to give solid support without introducing binding and frictional wear. Designers who consider all reciprocating slides to be necessary evils, claim that those running on ball bearings come closer to giving the solid support of an integral structure than any other form of what the more cynical refer to as "cob house construction".

Champions of plain slides counter by saying that through proper provisions for lubrication, their surfaces actually "roll on molecules of oil". If that be true, it looks almost like an argument in support of ball bearing slides.

SELLING ISN'T DEAD! About this time of year, 1948 through 1950, National Machine Tool Builders' and American Machine Tool Distributors' associations jointly sponsored machine tool sales refresher courses at Cornell and other universities. This year there is a break in that chain. There are to be no 1951 sessions.

This break—coupled with widespread belief that orders long will continue to pour in through office transoms—is inspiring absurd remarks such as, "Sales training in the machine tool industry is a dead duck!" Such statements are completely unwarranted. They are completely untrue.

The spirit of scientific selling still is very much alive in the machine tool industry. It is reflected in current advertising campaigns. Individual study of basic principles by machine and tool salesmen is being actively encouraged. The sales refresher courses undoubtedly will be resumed when key men of the industry again are free to devote their time and talents to planning and teaching these courses.

Good textbooks are even more important for individual study than they are for group training in classrooms. Therefore, the appearance at this time of an accredited book on application at plant level of the so-called "dynamic equipment policy" is most timely. It certainly helps to prove that machine tool salesmanship continues to be a recognized profession.

This book—entitled *Company Procedural Manual on Equipment Analysis*—is published by William Kelly & Co., 120 LaSalle St., Chicago 3. It costs $5.00. It is based on the working experience of this management consulting organization in applying the MAPI formula to equipment replacement in a noteworthy group of companies including Allis-Chalmers, Cooper-Bessemer, Jones & Lamson, Sundstrand and Worthington Pump & Machinery.

William J. Kelly, who wrote the foreward, is president of Machinery & Allied Products Institute, whose research director George Terborgh was largely responsible for developing the MAPI formula. Mr. Kelly's partner, Alexander Konkle, a man with broad experience in applying this formula in industry, had a major role in preparing the text.

The MAPI formula is becoming recognized as an economic "measuring tool", invaluable not only to sellers of machines but equally so to purchasers thereof. No measuring tool is effective, however, unless used properly. I recommend this book as "the practical operating manual for the MAPI formula".

DON'T BE HALF SAFE: The slogan which introduces this item is even more important as applied to elimination of operational hazards from industrial machinery than to elimination of social hazards associated with athletic activities.

In other words, a so-called "safety device" which is only half safe, or even only 99 per cent safe, is a delusion and a snare. It can be compared to the magic powder concocted by Merlin. This was sprinkled on knights to make them invisible to their foes—but didn't.

One of the problems in safety engineering on automatic machines, is to keep hand operating cranks and handwheels from spinning around when the machine is switched to high speed automatic control. Dependence on operators to disconnect these cranks and handwheels is not enough. Memories will fail and arms and wrists will be broken—just as they were when cranking up oldtime automobiles.

Disconnection must be 100 per cent automatic and it must be 100 per cent effective. I recall a case many years ago when a safety device was designed to disconnect the hand cranking mechanism used in setting up a multiple spindle automatic. After it was built someone discovered that it could be ineffective if the machine should happen to stop with a certain roll resting on the peak of a certain cam.

A series of experiments and a lot of conferences with operators — plus considerable self-hypnotism — convinced the management that the possibility of the roll stopping on the peak of the cam was about one in a million. They took a chance. They shipped the machine. An operator almost immediately did break his arm. A costly law suit resulted. Beyond all that the new machine got a "black eye" which persisted long after the hazard was eliminated.

Segregates in Steel Analyzed Spectrographically

Special spectrographic techniques are available for studying metal structures of many alloys, particularly the more complex types, and for making a continuous analysis of the variation across a segregate

IN addition to the large variety of routine control applications, the spectrograph is being used to advantage in the analysis of segregates in steel. The method also provides the metallurgist with a means for identification of inclusions in metals.

The quantitative aspect of spectrographic analysis depends upon the fact that characteristic atomic spectrum lines differ in their intensity and it rests upon two suppositions, that other things being equal, the intensity of a spectrum line is governed by the number of luminous atoms in the source of light and that the number of luminous atoms is proportional to the aggregate number of atoms in the sample.

Localized Spark Used—How spectrographic methods can be used to study metal structures was discussed by J. Convey, chief, Division of Physical Metallurgy, Bureau of Mines, Ottawa, Canada, in a paper presented before the first regional conference of the Analytical Chemistry Division of the Chemical Institute of Canada, Ottawa. In earlier tests conducted by Convey on the application of spectrographic methods to the analysis of segregates in steel, a highly localized spark was used for the examination of minute areas (0.31 mm diameter).

Weight of metal consumed in the test was approximately 0.000005-gram and from one exposure of 15 seconds the elements silicon, manganese metal, chromium, molybdenum, and vanadium were estimated. One use of this technique was the examination of a high speed cutting tool, Fig. 1. During heat treatment of these tools the tips had softened and the microstructure shown in the accompanying photomicrograph, Fig. 2, was found to exist in the troughs between the teeth. Spectrographic examination of the tool gave the carbon analysis presented in Table I. This general method also provides the metallurgist

Fig. 1—High speed cutting tool showing location of analyses using a highly localized spark with the spectrographic method. Table I gives carbon content at points tested

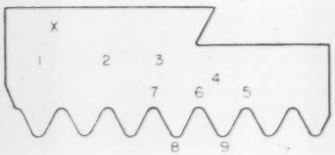
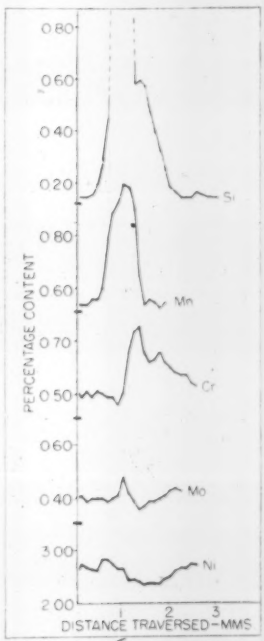


TABLE I

Exposure	log C III 2296.8 / Fe 2311.288	% Carbon
1	0.560—1	0.50
2	0.566—1	0.50
3	0.565—1	0.50
4	0.560—1	0.50
5	0.615—1	3.50
6	0.720—1	3.50
7	0.720—1	3.50
8	0.030	0.65
9	0.021	0.65

Fig. 2—Microsection of high speed cutting tool at base (trough) of tool



with a means for identification of inclusions in metals.

Conditions for using the above spark-spot method for analysis of steel aggregates are:

Instrument used	Hilger E. 1 quartz spectrograph
Wave band	2200-3000 A
Slit width	0.0015 cm.
Distance of electrode from slit	4 in.
Spark gap width	0.015 in.
Voltage	15,000 (open circuit)
Added inductance	nil
Upper electrode	silver rod, (7 mm in dia), nipple-pointed, height of nipple point 0.05 in., angle 36°, oxidized by pre-sparking for 15 sec.
Plate	Kodak Photoscrip B10
Exposure Time	15 sec.

Circular Segregates—This technique has also been applied by Convey to the analysis of segregates occurring in large forgings in nickel-chromium-molybdenum and nickel-vanadium steels. In this case, most of the segregates were roughly circular in cross section, having a diameter of approximately 0.04-0.08-inch. Their length, however, was considerably greater and because of this, longitudinal sections were prepared for spectrograph examination.

As the segregates were not visible on polished sections, an etch with Oberhoffer's reagent was used to bring out the segregate with a minimum of attack on the specimen. After etching, a number of separate exposures were made on the segregate and on the normal metal in positions well removed from it. Table II shows the results of analysis on segregate and nonsegregate sections of the forging. Tests on specimens from large forgings of nickel-chromium-molybdenum and nickel-vanadium steels, showing marked segregation, gave higher values for all elements in the segregates, as compared with the respective values for the matrix of the steel.

Traverse Spark Technique—Since critical examination of the results of analysis of steel segregates showed the existence of a variation in element composition within a segregate, a method was developed whereby a continuous analysis of the variation in content across a segregate could be made. The segregates were examined by traversing the samples with a highly localized condensed spark (1 mm/min) while the photographic plate on which the spectrum is recorded moved downward across the camera aperture of the spectrograph (10 mm/min). In this way a spectrogram is obtained on which the spectral lines vary in density over their length according to local changes with composition of the specimen along the path of the spark.

Versatility of the spectrographic method of metal structural analysis using the traverse spark technique is illustrated in Fig. 4, wherein a traverse of 2 cm was recorded. Maximum length of a single traverse using Convey's apparatus is controlled by the rate of fall and size of the photographic plate. However, by careful adjustment of sample and electrode it was found possible to traverse an extreme amount of sample providing the photographic plates maintained a high reproducibility from plate to plate. The dotted lines show the position of the break in the

Fig. 3 (left)—Analysis across a silicate inclusion in steel using the traverse spark method

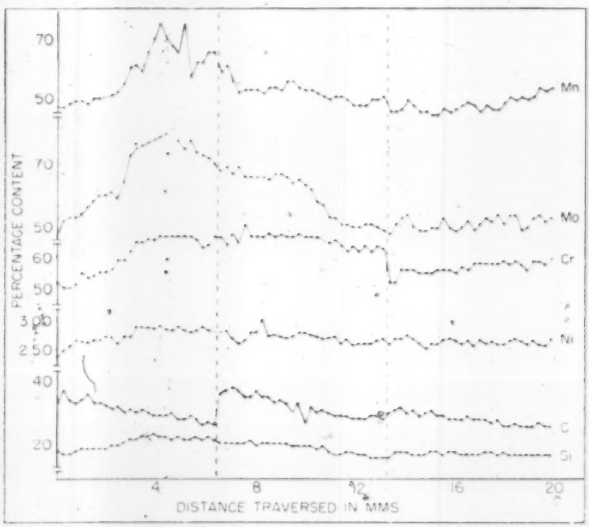
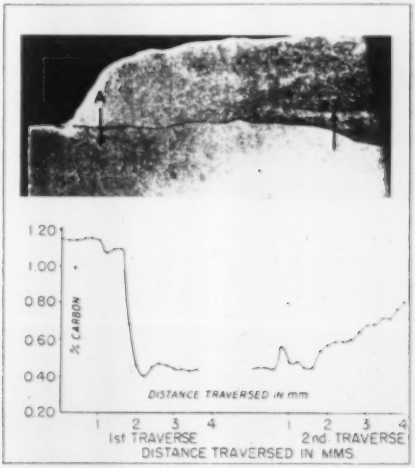


Fig. 4 (left)—Location and triple traverse across a steel segregate

Fig. 5 (below)—Traverse analysis across a weld



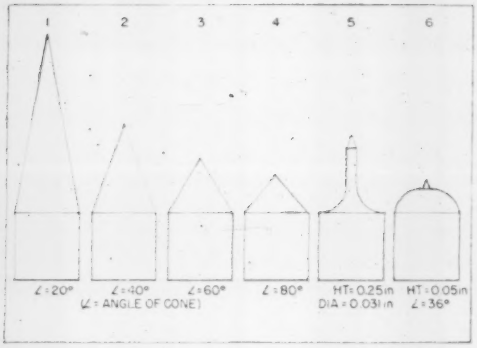


Fig. 6—Shapes of electrode points investigated in tests to obtain reduced sparking area for analysis of segregates. Specimen 6 gave best results

traverse, where the photographic plate was changed and a succeeding traverse commenced. The results show an excellent degree of continuity.

Curves Plus Micrographs—Another aspect of the method is its sensitivity with respect to the smallest structural inhomogeneity traversed. It can be seen that the content recorded by the traverse technique, when the traversed section is less than one sparked crater width in size, will be diluted accordingly by the adjacent material. The answer to this problem was obtained by a series of traverses across a wedge-shaped bar (5.5 cm long with a base of 2.5 mm) of nickel-chromium-molybdenum steel clamped between two pieces of mild steel.

From a knowledge of the chemical composition of the two steels and the constants of the method, theoretical content curves were calculated for traverse of the insert wedge bar at various positions along its length. Experimental results corresponded closely to these calculated values. The tests show that under controlled conditions a measure of the relative content variation within a metal structure can be added to the micrographical observations of the metallurgist. These studies established that the emission from the secondary discharge, which forms a halo around the main crater owing to the primary discharge, is negligible since a sudden change in content is evidenced when the spark traverse crosses the junction of the two steels.

Applied to Testing Welds—Experiments conducted on welded structures, showed that the special spectrographic method provided a simple method for studying metallic diffusion. Fig. 5 shows the analysis of a welded structure. Failure of this weld always commenced in the area marked A, and the traverse graphs illustrate the lack of carbon diffusion at point A, whereas in the second position, noted by arrow, normal diffusion had occurred.

Earlier work conducted by Convey had shown that to obtain a quantitative analysis of various steels for carbon a higher steady state potential of the spark gap was required. This was produced by blowing a small blast of dried air across the spark gap (pressure, $\frac{1}{2}$-inch of water). The method was standardized and tested. Analyses of segregates were identical with those obtained with the spot-spark and traverse spark techniques without air blast.

TABLE II

RESULTS OF ANALYSES ON NICKEL-CHROMIUM-MOLYBDENUM STEEL FORGING IN NONSEGREGATE AND SEGREGATE PORTION

Test No.	Silicon %	Manganese %	Nickel %	Chromium %	Molybdenum %
Tests on Nonsegregate					
1	0.15	0.46	2.77	0.65	0.43
2	0.17	0.46	2.68	0.59	0.42
3	0.18	0.50	2.68	0.59	0.44
4	0.17	0.46	2.66	0.55	0.39
5	0.17	0.47	2.75	0.62	0.44
6	0.18	0.46	2.68	0.59	0.43
7	0.17	0.45	2.60	0.56	0.38
8	0.16	0.49	2.65	0.56	0.39
9	0.17	0.47	2.73	0.61	0.42
10	0.17	0.46	2.68	0.58	0.40
Average	0.17	0.47	2.68	0.59	0.41
Greatest deviation from average	+0.01 −0.02	+0.03 −0.02	+0.09 −0.13	+0.06 −0.04	+0.03 −0.03
Tests on Segregate					
11	0.20	0.47	3.02	0.71	0.55
12	0.21		3.07	0.73	0.78
13	0.21	0.66	2.94	0.72	0.62
14	0.21	0.73	2.90	0.68	0.66
15	0.21	0.49	2.78	0.61	0.52
16	0.19	0.53	2.82	0.65	0.53
17	0.19	0.49	2.87	0.62	0.51
18	0.21	0.53	3.00	0.72	0.54
19	0.19	0.50	2.76	0.64	0.55
20	0.21	0.54	3.01	0.75	0.57
Average	0.20	0.55	2.92	0.68	0.62
Greatest deviation from average	+0.01 −0.01	+0.18 −0.08	+0.15 −0.16	+0.07 −0.07	+0.26 −0.11

A Nonexclusive Device—Thirteen different models are now in production, eleven for passenger cars and buses, two for military vehicles. Users include Cadillac, Oldsmobile, Pontiac, GM Truck & Coach, GM of Canada, Lincoln, Hudson, Nash and Kaiser-Frazer. Other would-be buyers, in this country and in Europe, have had to be turned down. Current daily output is 3400 units and going up as fast as plant expansion can accommodate it.

Unique feature of the drive is its split-torque arrangement. In high gear, for example, 38 per cent of the engine torque is transmitted through a fluid coupling, while 62 per cent is transmitted to the wheels

Transmission Reflects High-Rate Precision Manufacturing

THIS month the 3,000,000th Hydramatic production transmission will be delivered by the Detroit Transmission Division of General Motors Corp., marking a milestone in the manufacture of this automatic unit, the design of which was initiated in 1932, seven years before appearance of the first production model. The accomplishment was reviewed by Walter B. Herndon of DTD at a recent symposium on automatic transmissions conducted by the Society of Automotive Engineers at its summer meeting in French Lick, Ind.

Total weight of the transmissions produced in 12 years exceeds 375,000 tons and, installed in automobiles, the line of vehicles would fill a three-lane highway bumper to bumper from Boston to Los Angeles. Beyond that, there have been 85,000 military-type Hydramatic transmissions built for installation in tanks, armored cars and amphibious vehicles.

WELDING HERCULOY *plates into a hot water storage generator for the new Veterans' Hospital in Boston.*

ROLLING HERCULOY *plates into cylindrical form for the tanks. Photos from The Patterson-Kelley Co., Inc., East Stroudsburg, Pa.*

Once Again—

HERCULOY

is Chosen for Hot Water Storage Generators

HERCULOY is Revere's Copper-Silicon Bronze, which has the corrosion resistance of copper plus the strength of mild steel. It is therefore ideal for hot water tanks, among many other applications. Much has gone into domestic water heaters, but these are far outstripped in size by a number of large tanks fabricated of Herculoy by The Patterson-Kelley Co., Inc., East Stroudsburg, Pa., for the new Veterans' Hospital in Boston. The water is heated by steam passing through bundles of Revere Phosphorized Copper Tube. Inlet and outlet flanges are Herculoy, made from heavy gauge extruded shells, which offer economies over the alternative method of cupping them out of plate.

Patterson-Kelley weld all these large storage heaters, using Heliarc. Easy weldability is another important quality of Herculoy. Golden beauty is also a feature, and the size and beauty of these tanks created a great deal of comment while they were being trucked to the hospital. . . . Remember Herculoy's qualities: corrosion resistance of copper, strength of mild steel, easy weldability and formability, and beauty. Remember other applications besides tanks, such as: vats, screens, filters, ducts, fire extinguishers, chemical and marine construction.

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mechanically through hydraulically manipulated planetary gearsets, resulting in negligible slip through the fluid coupling while still realizing the advantages of cushioning engine shock.

Recent design improvement has been the inclusion of a new type of reverse. Previously the reversing action was obtained by manual engagement of a pawl with the reverse gear. Now it is obtained by the hydraulic engagement of a pawl with the reverse gear, the idea being to obtain easier and faster reverse application and to enable rocking the car from forward to reverse in ice, snow or mud.

Pump Design To Change—Soon to appear on the Hydramatic is a new variable-capacity vane-type pump. It comprises pump body, regulating slide, rotor and vanes, and the regulating valve, arranged to vary oil pressure output to the momentary requirements of the transmission and to supply a much greater capacity than pumps now used in automatic transmissions. Further benefits expected from the pump are cooler operation through reduction of churning; increased fuel economy; minimized internal leakage because of the higher low-speed capacity, and less operational variance due to temperature change.

An entirely new Hydramatic design recently appeared in connection with a demonstration of the General Motors Research 19xx engine at the American Petroleum Institute meeting in Tulsa (STEEL, May 7, p. 101). At one time it was believed this transmission would appear in the 1951 Cadillac models, but apparently production delays were encountered. To set industry speculation at rest, Mr. Herndon says: "Without going into much detail at this time, we can say that this future Hydramatic approaches the transmission designer's dream of combining into a single package the desirable features of all types of drive. We believe it will set new standards of smoothness, fuel economy, performance and engine braking."

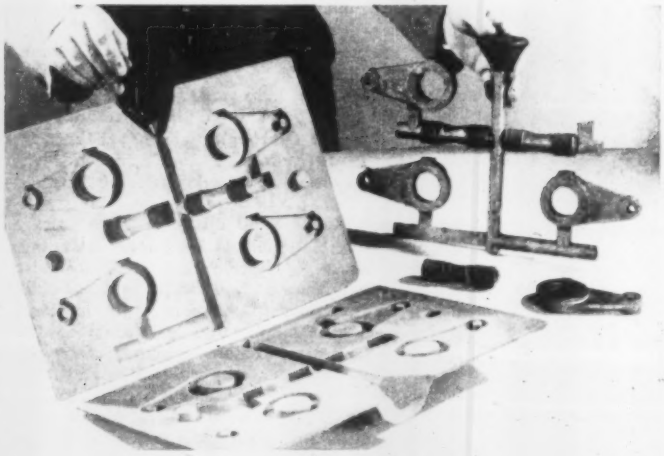
Application of the transmission to commercial vehicles as differentiated from passenger car use is a field which DTD has scarcely touched. While there have been several experimental applications made in trucks with favorable results, according to Mr. Herndon, it has not been possible to furnish them in production quantities because of the heavy demands of passenger car customers. The truck market may be one for cultivation when productive facilities catch up with current demand. Meanwhile the spreading defense program points up possibilities of new adaptations in military equipment where features of operational economy, positive gear ratios, acceleration, downhill braking and widespread service know-how are advantageous.

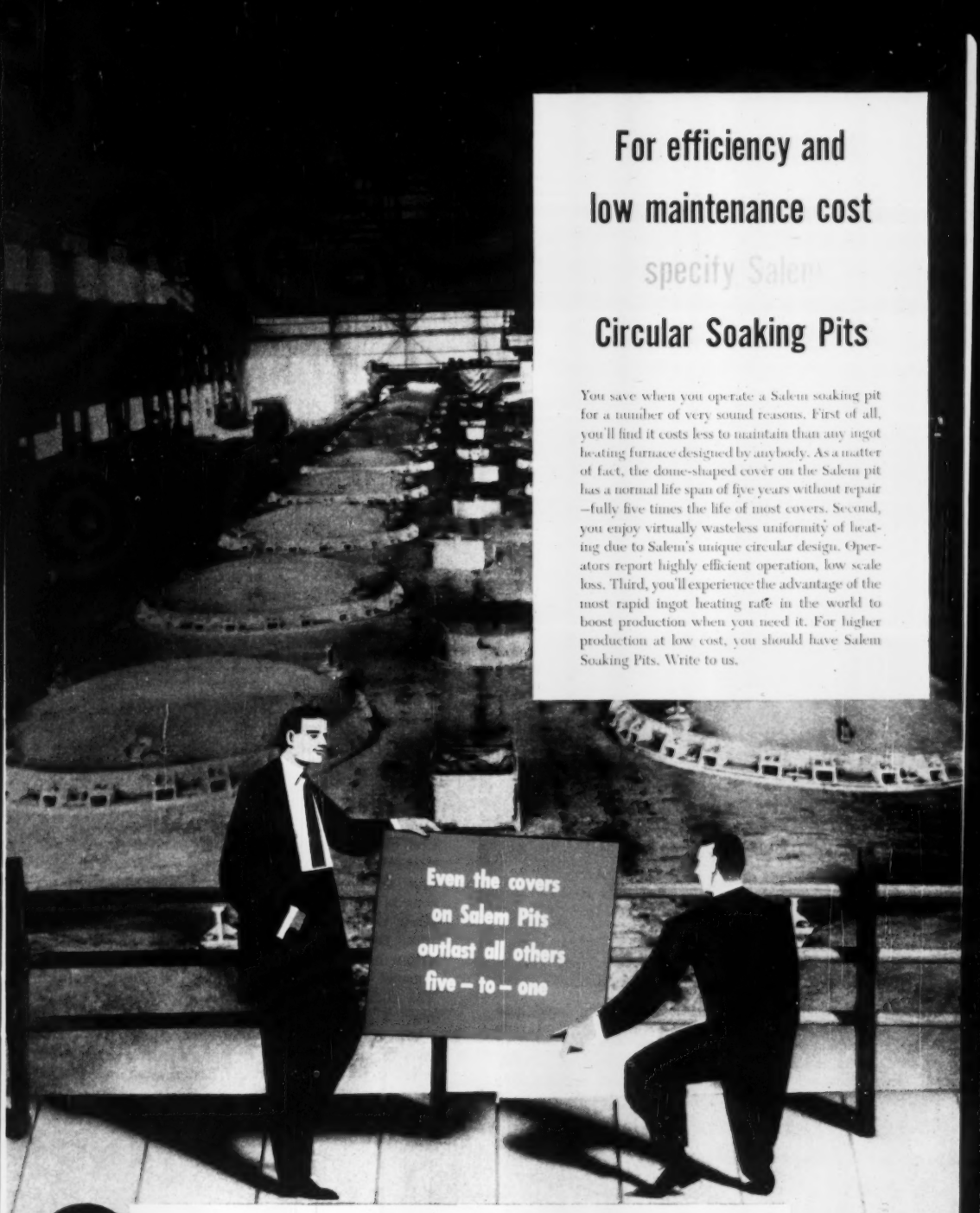
Shell Molded Parts Are Machined 30% Faster

FROM 30 to 40 per cent of the normal machining time is reported to be saved on production of Meehanite machine parts cast by the shell molding, or Croning process. This technique employs thin, shell-like single-use molds made of sand bonded with Bakelite phenolic resins. The mixture of sand and resins is applied in a thin coating to the surface of a heated metal pattern, then baked hard to form half of a mold.

Clamped together, the two halves of a mold, below, are placed in a flask, surrounded by steel shot or other suitable bedding material and the metal is cast. Smooth surfaces of the molds produce castings to tolerances of 0.002 to 0.003-inch per inch, drastically reducing the work necessary to finish the piece.

Builders Iron Foundry, Providence, R. I., found that a connecting rod cast by the Croning process and processed in lots of 300, can be drilled, ground and cleaned in almost 30 per cent less machining time than was previously required.

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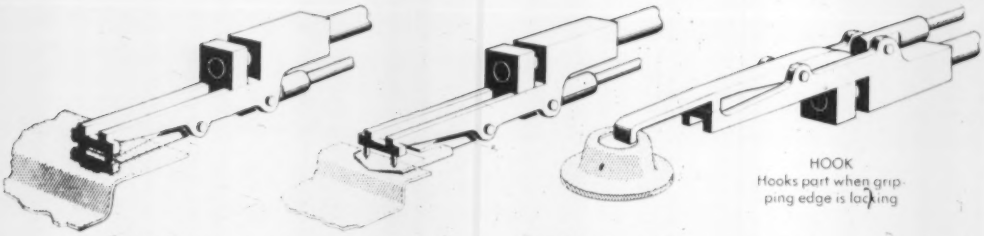


VISE STANDARD
Grips part with 2" clearance above die

CHISEL
Blade scrapes parts off die

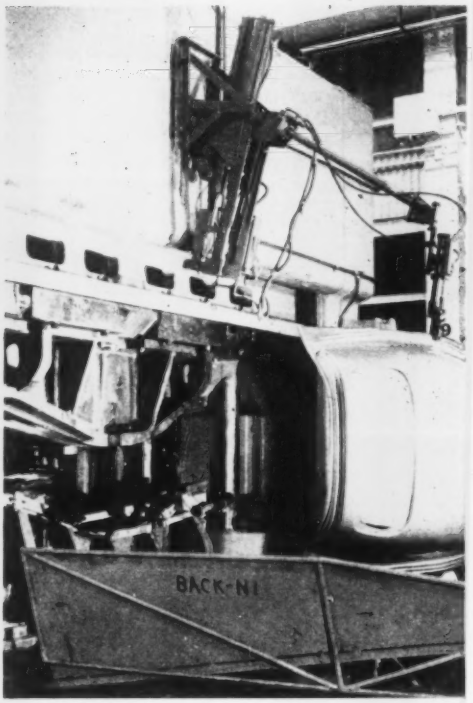
HOOK
Hooks part when gripping edge is lacking

Nimble Fingers for "IRON HANDS"

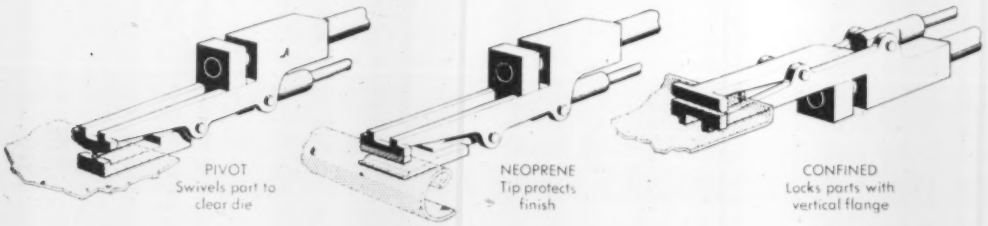
WITHDRAWAL of formed metal parts, both large and small, from stamping and drawing presses by mechanical means in rhythm with the press cycle is accomplished in many plants handling large volume of production by the use of the so-called "iron hand", one of many special devices developed in recent years for the automation of fabricating operations. Key to the proper functioning of an iron hand is a suitable jaw or gripper at its business end to permit pulling, lifting or sliding of the piece out of the die.

One of the leading builders of the equipment is the Sahlin Engineering Co., Birmingham, Mich., whose founder, Henry Sahlin, introduced his invention back in 1947 (STEEL, April 3, 1950, p. 102). Since then he has supplied more than 350 of them to mass production stamping plants, especially in automotive and domestic appliance industries. There are three basic types of Sahlin iron hands and at present six types of metal jaws which can be fitted to them, depending upon the type of operation involved.

Sketches of the various arrangements of jaw assemblies are shown herewith, along with an indication of how they function with respect to different shapes of parts. The first two, a vise and a chisel type, are basic designs which are applicable to 75 per cent of the automatic unloading operations encountered thus far. Recently, precision clamping with these jaws was improved with new vise and cone-type grippers. The four others are specialty types where unusual stamping shapes or conditions are involved. The hook type is used when a gripping edge is lacking. A grip with synthetic rubber tips protects parts where the finish must not be marred. A pivot type swivels laterally to clear tight die areas. A "confined" type locks a vertical flange stamping without damaging the edges.



Automatic press unloaders of the iron hand type make quick work of removing a 75-pound auto roof, normally handled by four men, from dies of the draw press. The arm has vise-type grippers, although there are five other types of jaws designed as shown for picking out other types of stampings

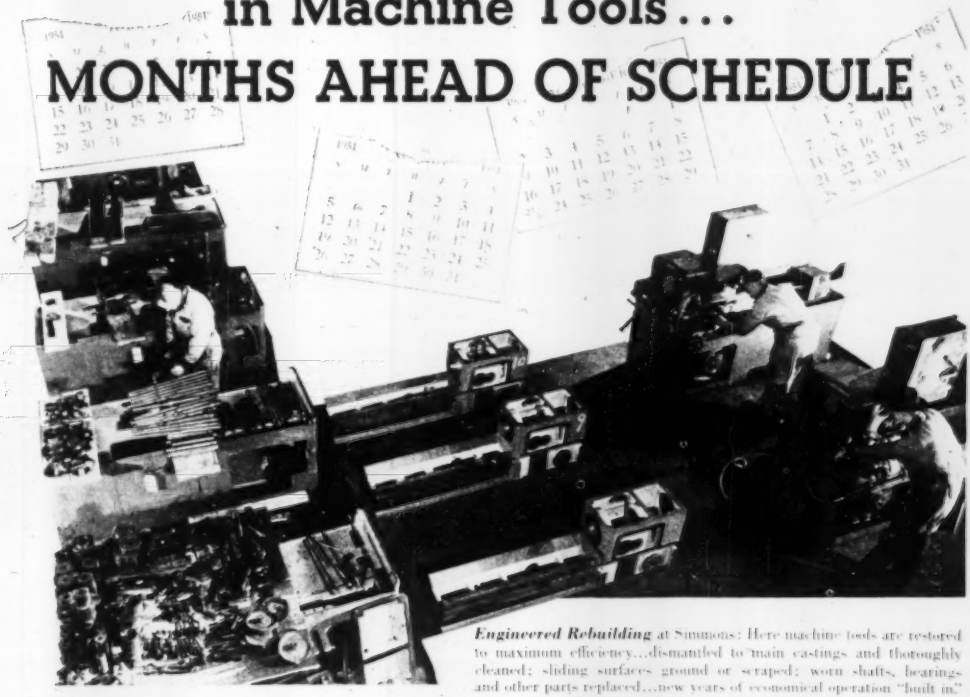


PIVOT
Swivels part to clear die

NEOPRENE
Tip protects finish

CONFINED
Locks parts with vertical flange

How you can get "EXTRA CAPACITY" in Machine Tools... MONTHS AHEAD OF SCHEDULE



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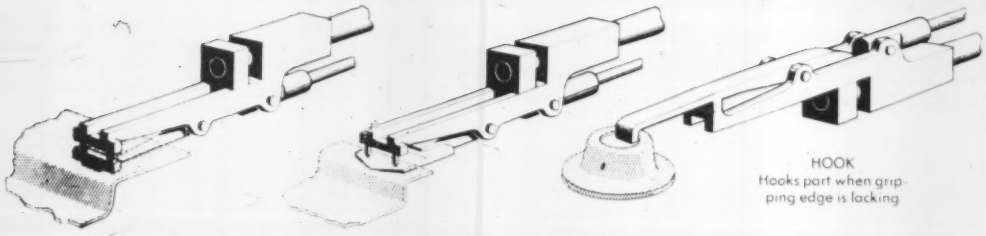
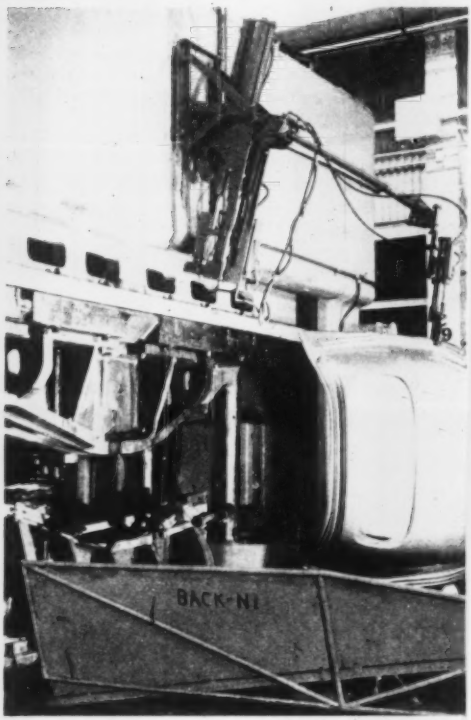


VISE STANDARD
Grips part with 2" clearance above die

CHISEL
Blade scrapes parts off die

HOOK
Hooks part when gripping edge is lacking

Nimble Fingers for "IRON HANDS"



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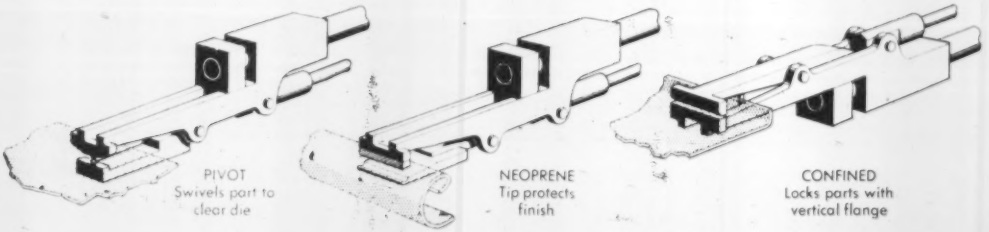
One of the leading builders of the equipment is the Sahlin Engineering Co., Birmingham, Mich., whose founder, Henry Sahlin, introduced his invention back in 1947 (STEEL, April 3, 1950, p. 102). Since then he has supplied more than 350 of them to mass production stamping plants, especially in automotive and domestic appliance industries. There are three basic types of Sahlin iron hands and at present six types of metal jaws which can be fitted to them, depending upon the type of operation involved.

Sketches of the various arrangements of jaw assemblies are shown herewith, along with an indication of how they function with respect to different shapes of parts. The first two, a vise and a chisel type, are basic designs which are applicable to 75 per cent of the automatic unloading operations encountered thus far. Recently, precision clamping with these jaws was improved with new vise and cone-type grippers. The four others are specialty types where unusual stamping shapes or conditions are involved. The hook type is used when a gripping edge is lacking. A grip with synthetic rubber tips protects parts where the finish must not be marred. A pivot type swivels laterally to clear tight die areas. A "confined" type locks a vertical flange stamping without damaging the edges.



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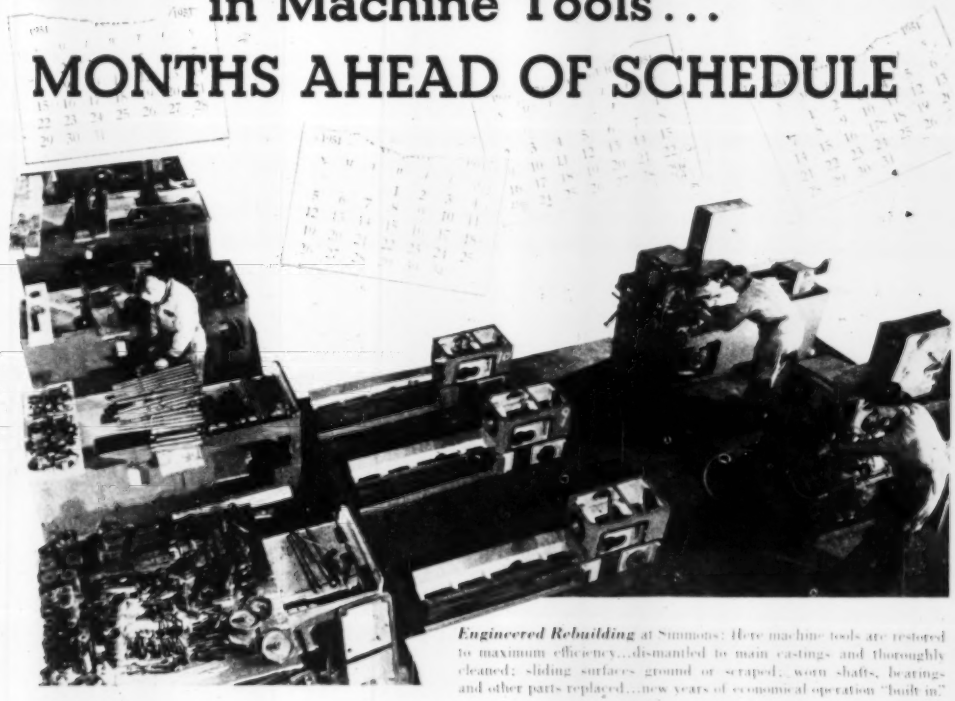

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mechanically through hydraulically manipulated planetary gearsets, resulting in negligible slip through the fluid coupling while still realizing the advantages of cushioning engine shock.

Recent design improvement has been the inclusion of a new type of reverse. Previously the reversing action was obtained by manual engagement of a pawl with the reverse gear. Now it is obtained by the hydraulic engagement of a pawl with the reverse gear, the idea being to obtain easier and faster reverse application and to enable rocking the car from forward to reverse in ice, snow or mud.

Pump Design To Change—Soon to appear on the Hydramatic is a new variable-capacity vane-type pump. It comprises pump body, regulating slide, rotor and vanes, and the regulating valve, arranged to vary oil pressure output to the momentary requirements of the transmission and to supply a much greater capacity than pumps now used in automatic transmissions. Further benefits expected from the pump are cooler operation through reduction of churning; increased fuel economy; minimized internal leakage because of the higher low-speed capacity, and less operational variance due to temperature change.

An entirely new Hydramatic design recently appeared in connection with a demonstration of the General Motors Research 19xx engine at the American Petroleum Institute meeting in Tulsa (STEEL, May 7, p. 101). At one time it was believed this transmission would appear in the 1951 Cadillac models, but apparently production delays were encountered. To set industry speculation at rest, Mr. Herndon says: "Without going into much detail at this time, we can say that this future Hydramatic approaches the transmission designer's dream of combining into a single package the desirable features of all types of drive. We believe it will set new standards of smoothness, fuel economy, performance and engine braking."

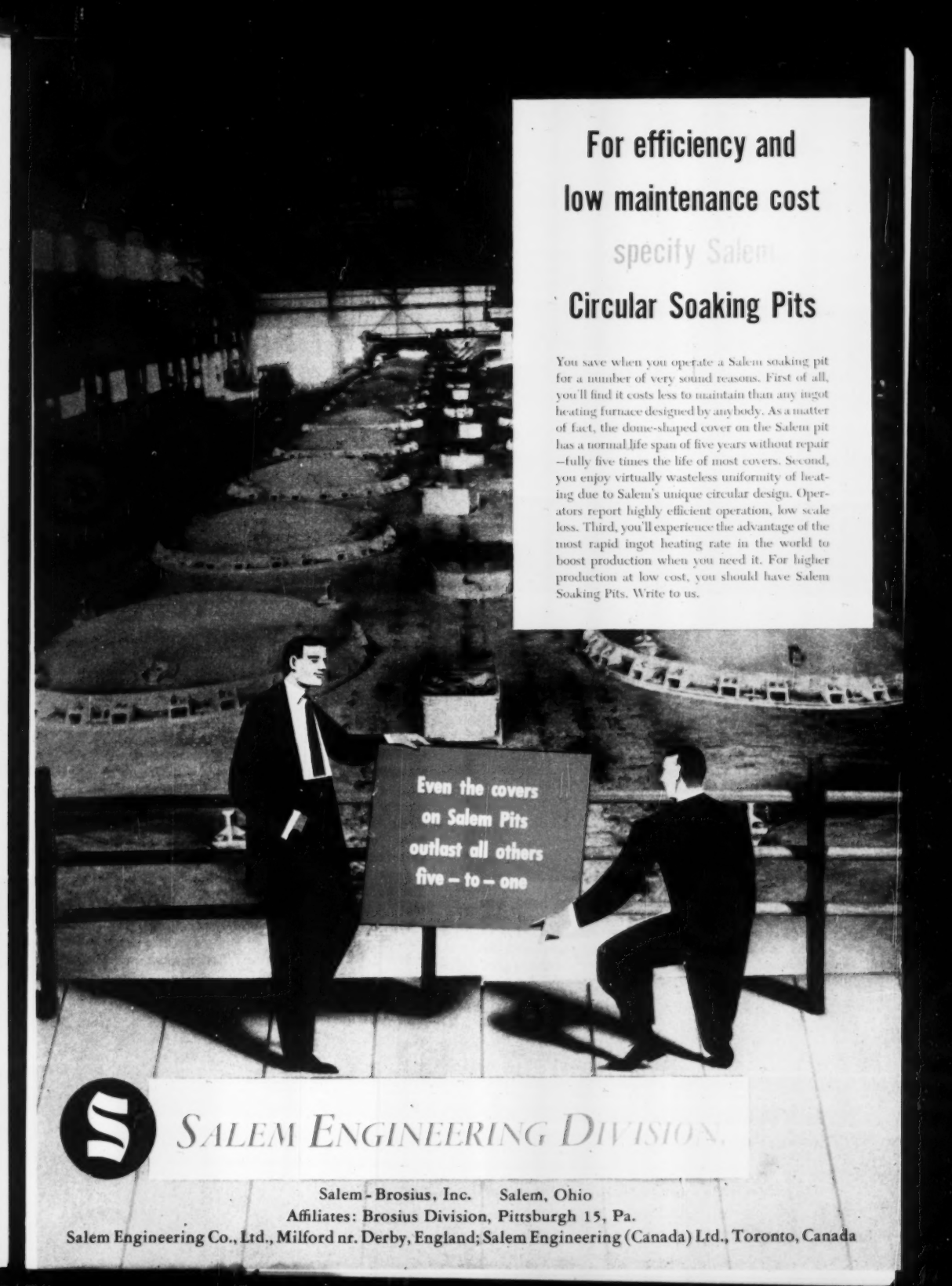
Application of the transmission to commercial vehicles as differentiated from passenger car use is a field which DTD has scarcely touched. While there have been several experimental applications made in trucks with favorable results, according to Mr. Herndon, it has not been possible to furnish them in production quantities because of the heavy demands of passenger car customers. The truck market may be one for cultivation when productive facilities catch up with current demand. Meanwhile the spreading defense program points up possibilities of new adaptations in military equipment where features of operational economy, positive gear ratios, acceleration, downhill braking and widespread service know-how are advantageous.

Shell Molded Parts Are Machined 30% Faster

FROM 30 to 40 per cent of the normal machining time is reported to be saved on production of Meehanite machine parts cast by the shell molding, or Croning process. This technique employs thin, shell-like single-use molds made of sand bonded with Bakelite phenolic resins. The mixture of sand and resins is applied in a thin coating to the surface of a heated metal pattern, then baked hard to form half of a mold.

Clamped together, the two halves of a mold, below, are placed in a flask, surrounded by steel shot or other suitable bedding material and the metal is cast. Smooth surfaces of the molds produce castings to tolerances of 0.002 to 0.003-inch per inch, drastically reducing the work necessary to finish the piece.

Builders Iron Foundry, Providence, R. I., found that a connecting rod cast by the Croning process and processed in lots of 300, can be drilled, ground and cleaned in almost 30 per cent less machining time than was previously required.



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You save when you operate a Salem soaking pit for a number of very sound reasons. First of all, you'll find it costs less to maintain than any ingot heating furnace designed by anybody. As a matter of fact, the dome-shaped cover on the Salem pit has a normal life span of five years without repair —fully five times the life of most covers. Second, you enjoy virtually wasteless uniformity of heating due to Salem's unique circular design. Operators report highly efficient operation, low scale loss. Third, you'll experience the advantage of the most rapid ingot heating rate in the world to boost production when you need it. For higher production at low cost, you should have Salem Soaking Pits. Write to us.

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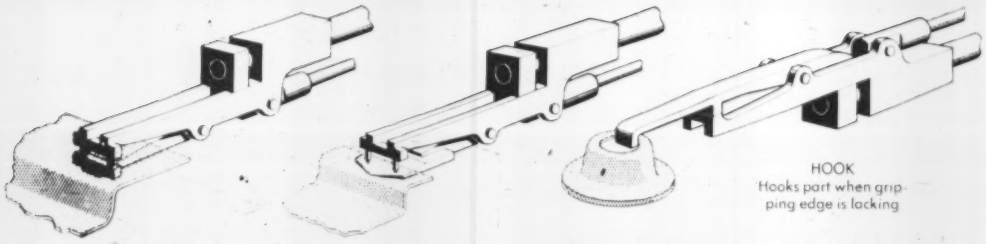

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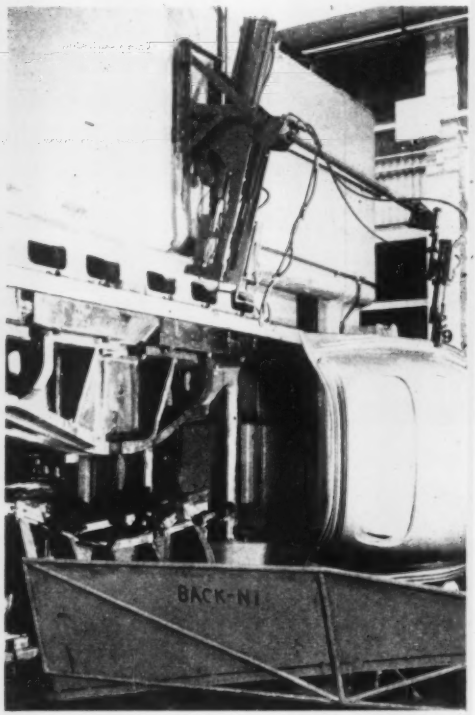

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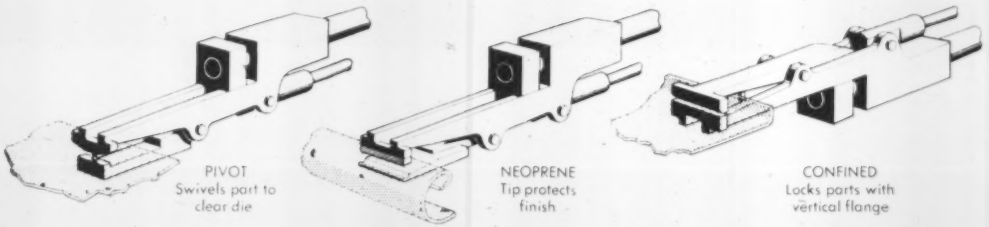

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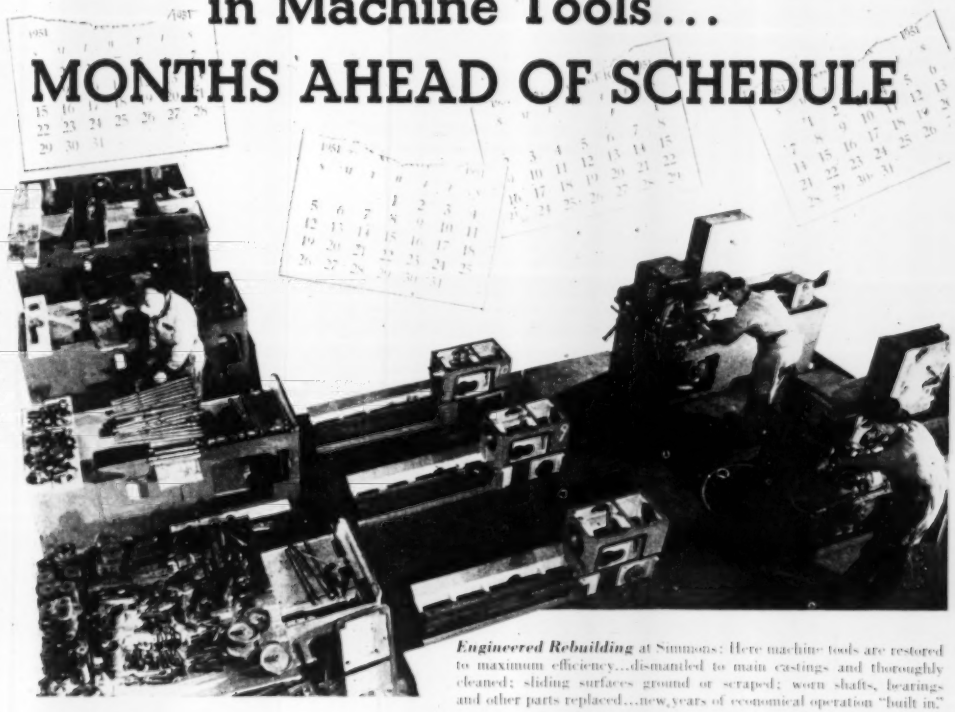

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COLD ROLLING STRIP

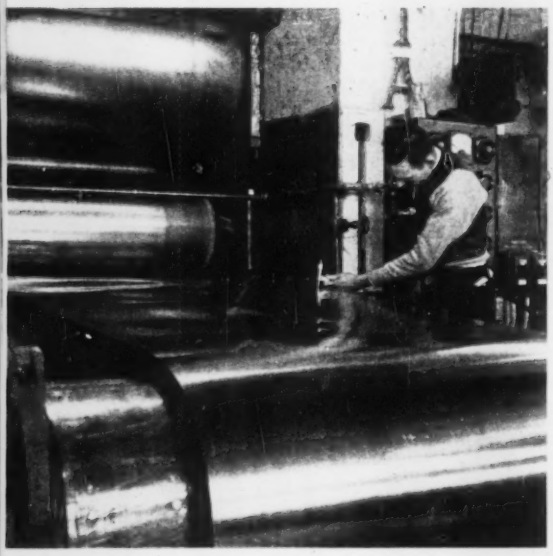
An appraisal of today's theory and practice

Practical problems encountered in strip mill operation including wavy edges, breakage at weld, pickup of particles, mill vibration and skidding are explained and remedies for their reduction or elimination are suggested by the author

By J. D. KELLER
Consulting Engineer and Partner
Associated Engineers
Pittsburgh

PART VI

ALTHOUGH tearing and breaking of strip occurs only infrequently, it is probably the greatest single source of loss of production in cold strip mills. It is especially serious in high-speed mills, where strip breakage results in a wreck, causing marking and, later, spalling of the rolls. When breakage of the strip occurs, it is usually in the later passes where the general practice has been to carry a higher tension in pounds per square inch than in the earlier passes, and where also the strip has become more brittle because of work-hardening. The most frequent cause of breakage is some defect in the steel, particularly at the edges of the strip. Small holes can result from tearing-out of particles by adhesion to the rolls in the hot mill, or from pickup of particles on the cold-mill rolls, which particles then punch through the strip. Defects at the edges usually result from dull or wrongly-set knives in the side-trimming shears preceding the pickler, but can also be caused by excessive rubbing of the strip edges on the guide plates, or from bumping when conveying the coils.



Measuring the gage at edge of strip on delivery side of 4-high cold mill

Why Tension Varies—A round hole can increase the tensile stress to three times the average, whereas a small tear or crack at right angles to the strip edge can multiply the stress by 10, in brittle materials such as work-hardened strip steel. Edge defects are therefore much more likely to cause strip breakage than those nearer the middle of the strip, hence the strip is often rolled with less tension at the edges than at the middle.

One way of effecting this is to roll the strip with nearly flat cross section or even with a slightly thin center in the early passes, and so regulate the contour of the rolls in the later passes as to reduce the thickness slightly more at the edges than at the middle. If the strip leaving the early passes has a hollow center, the finished strip may be rolled flat, or if the strip is flat when leaving the early passes, the finished strip will be slightly thicker in the middle, as shown (exaggerated) in Fig. 25. The latter contour is preferred for handling reasons. The work rolls in the early passes are given a slight crown, whereas those in the later passes are ground flat or cylindrical. Since, first, the rolls may become slightly hollow from wear, and second, the contour of the entering hot band or strip produced by the hot strip mill varies appreciably from time to time and this may greatly vary the edge tension in the strip, the actual operating contour of the cold mill rolls is controlled by adjusting the distribution of the high-pressure cooling water among the various spray nozzles across the roll face to produce that temperature distribution which will give the contour desired.

Wavy Edges Are Produced—In reversing mills, where only two work-rolls take care of all passes and their contour therefore cannot be exactly correct for more than one or two, the difference in reduction be-

"KARBATE" BRAND IMPERVIOUS GRAPHITE HEAT EXCHANGERS FOR ALL PURPOSES!

• The "Karbate" impervious graphite heat exchangers illustrated are used extensively as boilers, coolers, condensers, vaporizers, evaporators, heaters and absorbers in handling corrosive chemicals, either hot or cold. They *all* can be had in a complete size range. *All of them* offer the following advantages:

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- **Freedom from corrosion scale, as compared to metals.**
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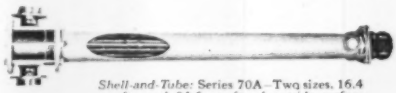
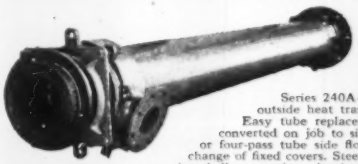
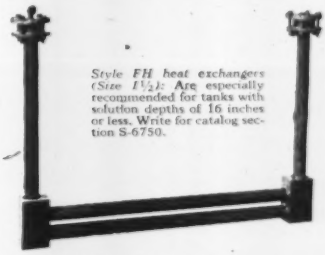
- **No contamination of product.**
- **Strong and easy to install and maintain.**



Shell-and-Tube: Series 70A—Two sizes, 16.4 sq. ft., and 24.6 sq. ft. of outside surface area respectively. Tubes easily replaced in the field. Interchangeable single and double-pass construction.

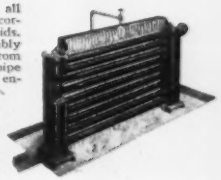


Series 240A—70.6 feet of outside heat transfer surface. Easy tube replacement. Easily converted on job to single, double, or four-pass tube side flow by simple change of fixed covers. Steel shell, oversize shell connections, impingement plates and drain and vent plugs integral with shell end castings. Stainless-steel baffles assembled with steel tie rods to form protective cage for tube bundle. Removable "Karbate" tube bundle. Write for catalog sections for S-6690, S-6715 for details of applications, maintenance, sizes and characteristics of these exchangers.



Style FH heat exchangers (Size 1½): Are especially recommended for tanks with solution depths of 16 inches or less. Write for catalog section S-6750.

Cascade coolers: For all cooling jobs involving corrosive gases and liquids. Complete cooler assembly may be made quickly from 4 standard items in 5 pipe sizes. Capacity easily enlarged or reduced by adding or subtracting standard sections. Compact construction to save plant room. No special supporting structure needed. Write for catalog section S-6780.



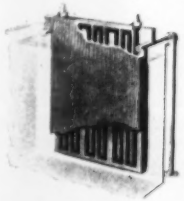


Plate heaters: Used to heat or cool corrosive liquids in tanks and vessels. Compact, completely assembled, easy to put in. Used in pickling, etching, plating and cleaning tanks. Complete size range. Models for horizontal and vertical mounting. Write for catalog section S-6620.

Concentric Tube exchangers: Available in two types. Series 10A is small, low-priced, gives true counterflow. Exceptionally good for small flow rates at narrow temperature differences . . . Series 20A manufactured with "Karbate" inner and outer piping, and is used to transfer heat between two corrosive fluids. Both have sectional construction, can be added to or subtracted from at will. Sturdy, can be moved from place to place after assembly, adapted to any method of mounting on floor, wall, or ceiling. Write for catalog section S-6670.

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A full line of "Karbate" impervious graphite pipe and fittings

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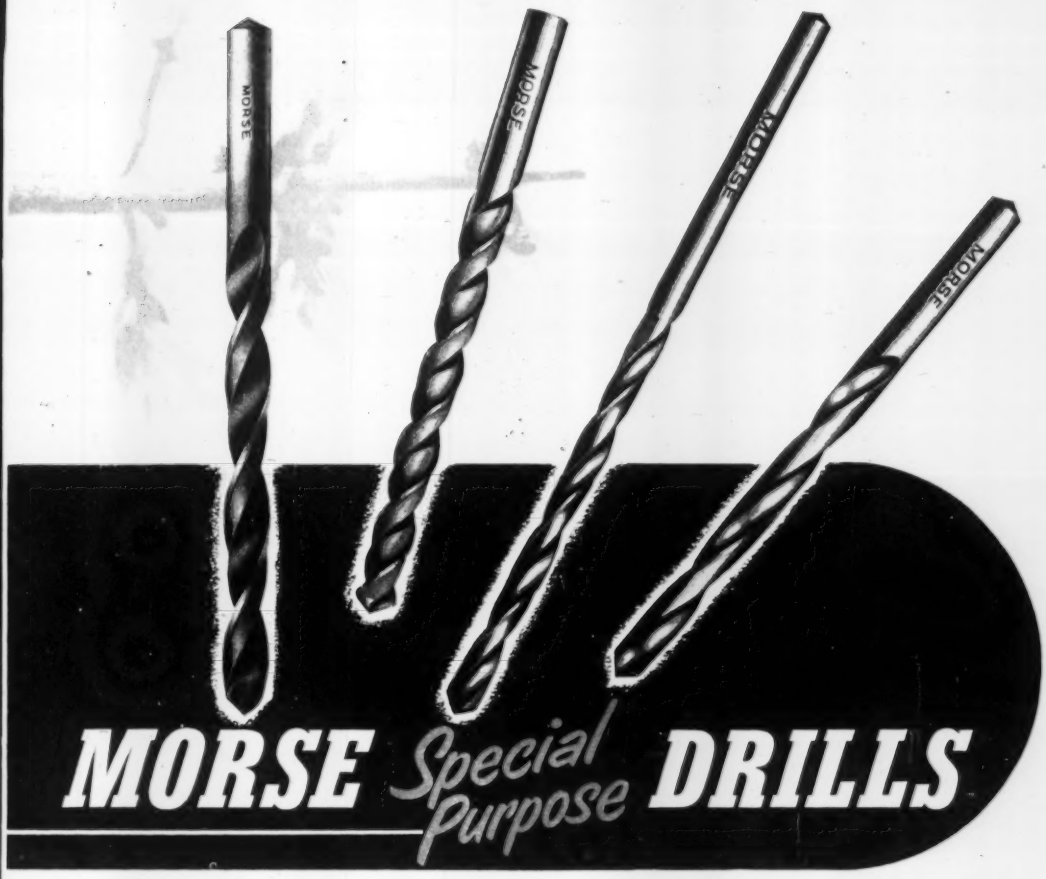
...and so is each of these



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For these and many other highly specialized drilling jobs, Morse has the top-quality drills *especially designed for those jobs.* And these Morse-Quality Drills are available only through your Morse-Franchised Distributor. Get in touch with him today . . . and get extra-special results *and savings.* For even greater production . . . and savings . . . specify Morse Electrolized.

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MORSE

Cutting Tools

tween middle and edges of the strip is often carried to the extent of actually producing wavy edges in the strip, thus reducing the edge tension practically to zero. In tandem mills, the difference is much less; it is far from sufficient to produce wavy edges, in fact only enough to reduce the edge tension moderately; and to compensate for this, in recent practice the average tension in pounds per square inch in the later passes is frequently reduced somewhat below the unit tension in the earlier passes.

Aside from the above-described method, it might be possible to increase the tension above the average in the middle and reduce it at the edges of the strip, to a sufficient extent, by so contouring the tensiometer roll that it has a slight crown.

Breakage of the strip can also be caused by defective tension control. Kaufman[25] described a condition in which, particularly during the acceleration period, too much palm oil on the strip caused a loop to form momentarily between stands Nos. 4 and 5 of the tandem mill, corresponding to complete loss of tension. As the mill continued to accelerate, the slack was then taken up rapidly and the resulting jerk frequently caused breakage of the strip. This was remedied mechanically, by avoiding excessive supply and insuring uniform distribution of the palm

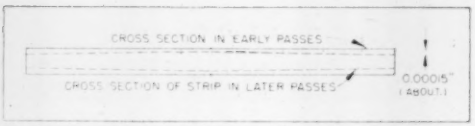

Fig. 25—Diagram (exaggerated) showing greater reduction at edges than at middle of strip, in later passes

oil, and electrically, by decreasing the percentage IR drop compensation on the motors driving the stand preceding the loop and increasing it for the stand following the loop, during the acceleration period.

Breakage Occurs at Weld—Strip breakage sometimes results from the welds passing between the rolls at full speed. The front end of each coil coming from the hot mill is welded to the rear end of the preceding coil before the continuous pickler which precedes the cold-reducing mill. The strip after pickling is again cut into separate lengths before recoiling, depending on the size of the coil desired for the cold mill, but it seldom happens that the welds can be cut out. Every effort is made in the grinding or planing following the welding operation to remove all flash and bring the weld down to the exact thickness of the adjacent strip, but even when this is so successful that the presence of the weld can hardly be detected by eye, still the weld metal is both harder and less ductile than the rest of the strip. Actual roll pressure or force measurements have shown a decided increase of force as the weld passes between the rolls, with a severe blow on the strip following the weld[27], probably due to roll inertia. The momentary increase of tension caused by the smaller reduction of the hard metal at the weld and the blow from the rolls, may break the strip not at but adjacent to the weld. However, even when the welds are rolled at full speed, according to Powell[27] such breakage occurs in only 3 to 4 per cent of the welds, in the Aliquippa mill.

Slowing down the mill to allow the welds to pass through slowly, besides having the disadvantage of decreasing production, does not always eliminate the breakage, since Stoltz and Brinks found that slowing down from full speed to threading speed caused an increase of tension throughout all passes, due to the previously mentioned increase of gage of the strip. In their tests on the high speed mill at Weirton, the increase ranged from 43 to 88 per cent of the total normal tension, and this increased the tensile stress between Nos. 4 and 5 stands to about 40,0000 psi. If coincident with the presence of an edge crack in the strip, this increase of tension could result in breakage.

Pick-up of Particles Cause Defects—Operators keep the strip surfaces under constant inspection, but in spite of this, particles adhering to the rolls can cause periodically recurring defects in the surface over a considerable length of strip, in high-speed mills. Such particles may be bits of scale which have been rolled into the surface in the hot mill and loosened but not removed in the continuous pickler; or bits broken off from laminations if these are present in the steel; or, finally, they may be the pieces pulled out of the craters at the places where welding to the roll surface occurs during stick-slip friction, as observed by Bowden and Leben[19] and by Nekervis and Evans.[17] Welding takes place only if the boundary film of lubricant is imperfect, so that actual metal-to-metal contact of strip on rolls occurs at the high spots.

Constant watchfulness, careful pickling and scrubbing, and cleanliness of steel seem to be the only remedies.

Roughness of Strip Surfaces. Excessive roughness usually results from laminations or dirt in the steel, but less conspicuous roughness may be caused by roll surfaces which have been roughened by wear or were not initially of sufficient smoothness. Finished strip surfaces are graded as No. 1, which has a root-mean-square roughness of 15 to 30 microinches (millionths of an inch); No. 2, having 5 to 10 microinches, and No. 3, with 1 to 2 microinches. By far the greater part of the strip produced at present has No. 1 surface finish, but the tendency is to increase the proportion of No. 2. Of course, these finishes are produced by the final rolling in the skin pass or temper mill, but the latter cannot eliminate excessive roughness produced in the cold-reducing mill.

For some uses such as hot-dip tinning and especially for enameling, the roll finish in the temper mill is sometimes made such as to open up the surface of the strip in order to permit more effective alloying of the tin with the strip surface, or better adhesion of the enamel. Also in temper mills, the roll surfaces are (or were) sometimes purposely roughened, with the object of reducing or eliminating stretcher strains or Luders' lines in the strip material during later cold-forming.

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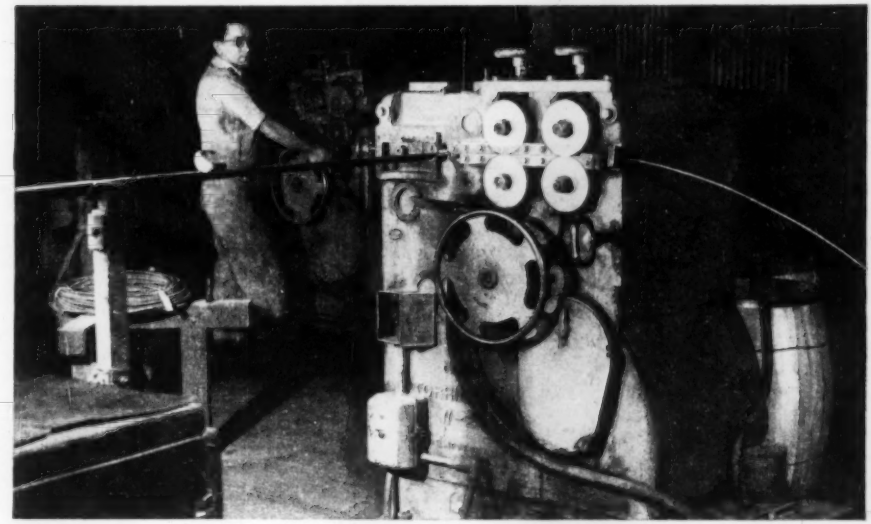

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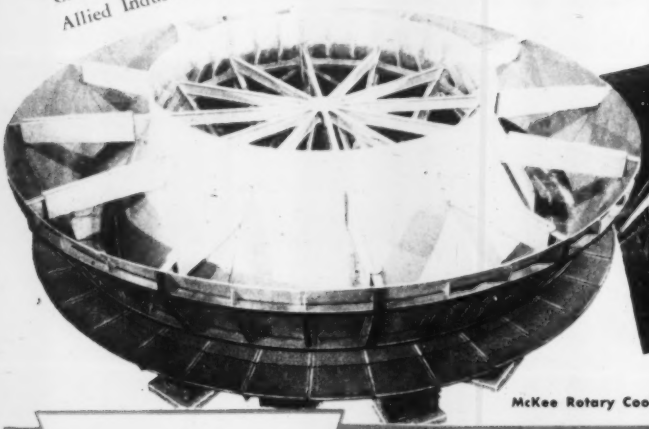

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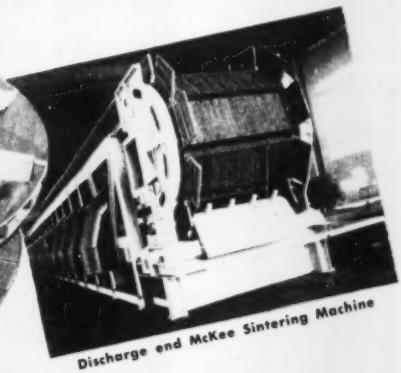

Discharge end McKee Sintering Machine

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trouble is not of frequent occurrence, but when it does occur the cause may be difficult to locate, especially since the vibration ordinarily occurs at irregular intervals of seldom more than 15 seconds duration. Stick-slip friction of the strip on the rolls could produce it, either in the form of tangential compression waves traveling around the roll circumference (Rayleigh waves), due to variation of frictional traction; or in the form of transverse vibration of the roll as a whole, due to periodic fluctuation of the radial force resulting from change of the friction hill. The extreme violence of the vibration in high-speed mills would seem to indicate that it is caused by some action involving the total force exerted on the rolls. On the other hand, the transient nature of the vibration points to a resonance effect, which could be produced by comparatively minor forces.

Out-of-roundness or eccentricity of the backup rolls has been shown by oscillograph tests to produce vibration. Friction in the universal joints (poor lubrication or worn slippers), and insufficient clearance in the roller bearings of the work rolls have also been suspected or shown to have been either primary or contributing factors. Too great flexibility (and probably deficient damping) of the tensiometer head has been blamed in one case. In another, insufficiently smooth finish of the rolls seems to have been responsible, because changing to No. 80 grit finish or finer, eliminated the chattering.

In high-speed mills the most probable or most frequent cause of vibrations seems to be either unbalance of the pinions or inaccuracies of the pinion teeth, especially in the last passes where the rolls are "geared up" to a higher speed than the motors. In such mills, even the collection of water or oil in a recess at one side of the pinions has caused sufficient unbalance to produce troublesome vibrations.

Skidding of Rolls on Strip—In all except the pull-type mills, the greater part of the energy required for rolling is supplied by transmitting torque through the rolls. If the torque exceeds the product of:

Coefficient × Roll force × Roll radius

then skidding occurs, which is the slipping forward of the roll surface as a whole, relative to the strip surface in the contact area. From this standpoint, it is possible for the coefficient of friction to be too low. Skidding may also be initiated by excessive back tension.

Skidding is undesirable not only because it interferes with control but especially because it produces scratches in the strip surface. Powell[27] and Kaufman[28] found, in the high-speed mill at Aliquippa in which the top and bottom rolls are not geared together and hence the torques could be separately measured, that for equal division of torque the top work roll is more likely to skid than the bottom one, apparently because of better retention of oil on the top of the strip; and that the skidding produced numerous fine scratches of short length, in the strip surfaces. The shortness of the scratches (their length being of the same order as the contact length) indicates that they are caused by metal particles, possibly the high spots torn from the strip by stick-slip friction, adhering to the rolls and carried part way into the contact length before they become imbedded in the strip.

Accurate control of the amount of lubricant supplied to the strip, and avoidance of too great back tension, seem to be the remedies for skidding. Recently it has been found that increasing the pressure of the cooling water sprays used on the rolls (for example, from 80 to 150 psi) and properly controlling this pressure, are quite effective means for eliminating scratches and at the same reducing the consumption of palm oil.

(To be continued)

Previous installments of the accompanying treatise have appeared in the February 19, March 5, 19, 26 and May 14 issues and have dealt largely with the theoretical aspects of the subject. The present and succeeding installments treat of the practical aspects.

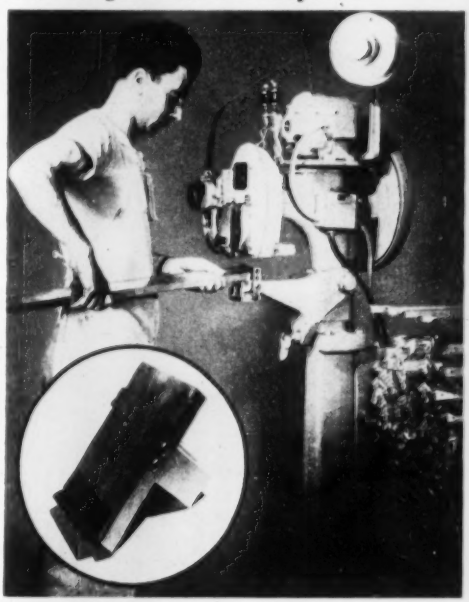
REFERENCE

37. G. E. Stoltz and J. W. Britiks, *Iron and Steel Engineer*, October, 1950, pp. 69-77 and discussion pp. 78-88.

Correction

Caption for Fig. 13, Part III (STEEL, Mar. 19, p.80) should read: "Decrease of friction with *increase* of number of layers of oil molecules," etc.

Stitching Cuts Assembly Time



OPERATOR is attaching rubber feet to extruded aluminum ladder legs by use of an Acme-Morrison metal stitcher at Bardwell & McAllister Inc., Burbank, Calif. Metal stitches of 0.051-inch diameter, cold drawn wire are driven through a single layer of aluminum, two layers of rubber and clinched—all in 1/5-second. Total stitch penetration is ¼-inch of rubber and 0.093-inch of aluminum. In comparison with drilling and bolting methods of attachment, stitching reduced assembly time over 85 per cent and cut material costs—less than 1½ cents per 100 stitches

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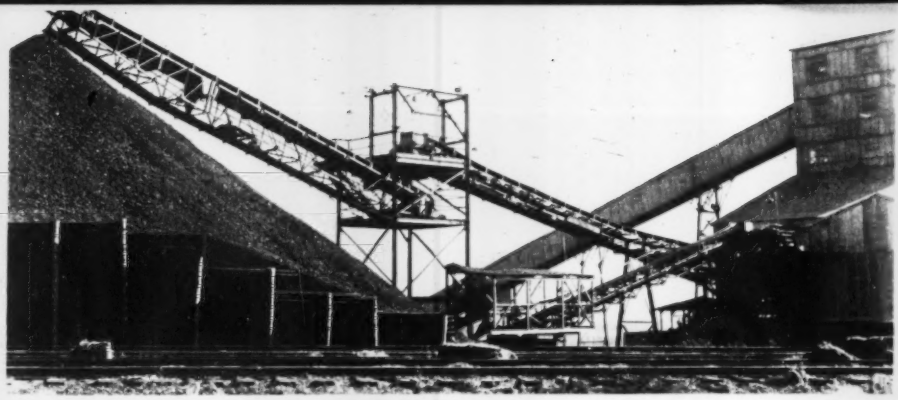


This roller-bearing belt conveyor system for stocking-out and reclaiming washed iron ore has a stacker boom of 60-foot radius

Conveyor Belt Stackers Facilitate Iron Ore Handling

IRON ORE requiring beneficiation is preferably shipped as soon as possible after being processed; however, at times quantities must be stockpiled at the plant when railroad cars are not available for immediate shipment. At the Coleraine, Minn., Canisteo mine of Cleveland-Cliffs Iron Co., two different types of Link-Belt conveyor belt stackers handle this important phase of iron ore production.

One consists of a 30-inch wide troughed belt conveyor mounted on a 60-foot long steel boom, supported in a fixed inclined position from a structural steel tower. Distance from discharge tip of boom to ground is approximately 45 feet. The conveyor belt operates at 440 fpm and is fed washed iron ore of minus 1½-inch size directly from an adjacent washing plant by means of other Link-Belt conveyor equipment.

The system is capable of stocking-out ore at the rate of 300 tons per hour and forming a surge pile of some 8000 long tons of washed ore, ready for retreating in a heavy density plant.

There is a tunnel under the pile, permitting the ore to be reclaimed to a 42-inch wide heavy-duty roller supported apron feeder-conveyor equipped with a 5-hp P.I.V. variable speed drive. The apron feeder delivers to an inclined belt conveyor for transfer to the heavy density plant.

The other stacker is of the more versatile self-propelled type, traveling on a wide gage railroad track. It has a revolving upper frame equipped with a 100-foot radius boom supporting a 24-inch wide belt conveyor for stockpiling ore in an oblong pile on each side of the track.

Conveyor Moves With Stacker—Aside from its self-propelling and revolving features, the stacker has attached to it a 500-foot long, 24-inch wide trailer belt conveyor mounted on 24-inch diameter single flange car wheels for travel along T-rail tracks with the stacker as it moves ahead.

This traveling, track-mounted arrangement of stacker and trailer belt is fed minus 1½-inch ore from the washing plant by a stationary-mounted belt conveyor which can deliver ore to the trailer belt at any point in its length. This permits the stacker to travel ahead until the trailer belt's foot end has finally reached the discharge end of the feeder-belt from the washing plant.

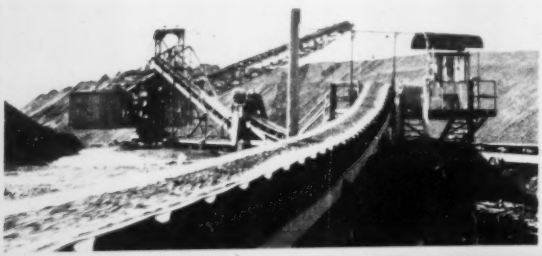
Consequently, up to 75,000 long tons of ore can be stored on each side of the stacker tracks, with the help of a bulldozer to spread out the pile as required.

The washed ore weighs 135 pounds per cubic foot and can be stockpiled at the rate of 400 long tons per hour, to a maximum height of approximately 35 feet. The stacker has a maximum swing of 180 degrees and is able to travel and swing simultaneously.

Travel speed, forward or backward, is 15 fpm. The need for traveling is infrequent. Track clamps are provided to secure the machine in position, especially when it is not in use.

This type of traveling stacker makes it possible to stockpile ores of different analyses in separate piles. A crawler shovel is employed for reclaiming the ore from stockpile to railroad cars for shipment.

The Cleveland-Cliffs organization is now installing a similar stacker and trailer conveyor at its Holman-Cliffs mine, Taconite, Minn. It is being equipped with wider gage trucks, a 30-inch wide conveyor belt, and a 110-foot long stacker boom, with capacity to stockpile 600 long tons of ore per hour.



For stockpiling minus 1½-inch washed iron ore at the rate of 400 long tons per hour, Cleveland-Cliffs uses this roller-bearing conveyor system having a 100-foot radius traveling stacker and a 500-foot long trailing belt conveyor section mounted on T-rail tracks. Feed conveyor in left foreground extends from the washing plant and is mounted on stationary supports. Control platform at junction of feed and trailer conveyors is seen at right

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Extruded and Drawn Steel Cartridge Cases Approaching Standardization

(*Continued from Page 76*)

presses would have to be removed and stored at a cost approximating the installation. The latter would be saved if installed in an Army plant and the maintenance cost would be no more than if the presses were stored in a warehouse or if the private plant were leased and protection and maintenance of the equipment paid for. All joint and Army-only plants would be contractor-operated.

In addition to the development of manufacturing methods aimed specifically for use in the standby plants, the Army is currently conducting other projects on steel cartridge cases. Two contracts have been let on steel 20mm cartridge cases. One is with the Stoner Mfg. Co., Aurora, Ill., covering a process of cold extrusion from low carbon steel bar stock. In this process a deep cup is backward extruded from a hot forged slug, followed by one forward extrusion and one conventional draw.

Another is with Proctor Electric Co., Philadelphia, covering the conventional process of cupping and drawing from medium carbon steel plate. The latter company was one of the most successful manufacturers of that case during the war. Just at the end of the war it had produced an experimental lot which embodied all its wartime experiences. However, it had not been ballistically tested. Recently, with the aid of the company, 200 cases from the lot were ballistically tested at 112 per cent chamber pressure without malfunction.

A novel feature of the Proctor development is the forming of the extractor groove in the head of the case by pinching or working it cold instead of by machining. This has overcome flange fractures particularly at subzero temperature firings. Both companies have had successful results in ballistic tests of pilot lots and the development work is nearing completion.

105mm Cold Extruded—A contract has been completed with the Heintz Mfg. Co., Philadelphia, covering a process of cold extruding from bar stock the 105mm howitzer steel cartridge case. Ballistic tests have shown the case to be satisfactory.

During the war, most steel cartridge cases were made from plate by the disk, cup and draw method—the method used for making brass cartridge cases. Some work was done in the substitution of a hot forged cup for the cup made from a disk. The hot forged cup was made from bar.

The advantage of using bar instead of plate is in the reduction of the amount of steel required. Twice as many cartridge cases can be made from an ingot of steel if bar is used instead of plate. Yield from ingot to bar averages about 78 per cent; from ingot to plate about 60 to 65 per cent. Yield from plate to round disk is about 71½ per cent and from ingot to disk about 32 per cent. By careful blanking this can be increased to about 44 per cent.

Loss in making the case from bar stock depends on the method of cutoff (saw or shear). Process losses consisting of intermediate and final trims and head machining are no different than for cases drawn from disks. The use of hexagonal instead of round disks reduces the amount of blanking scrap by almost 20 per cent. However, that saving was practically all lost in trimming operations in past tests of hexagonal disks. Proctor Electric Co., in its work on the 20mm steel case, is again investigating the hexagonal disk by attempting to shape the hexagon into a round before the cupping operation.

Press Operations Cut—The number of press operations required to draw the 105mm howitzer cartridge case from a steel disk during World War II varied from eight to ten. This was reduced to seven press operations from bar by cold extrusion in the first successful attempt, and it undoubtedly can be further reduced by one operation. A hot forged cup generally replaces the first two press operations from a disk. The cold extrusion process generally replaces all press operations except final draw, head and taper. It is generally necessary to machine the outside of a hot forged cup to obtain the necessary concentricity or uniformity of wall thickness as well as the desired surface finish, which are required in the subsequent drawing operations. No machining is required for cold extrusion.

Cold extrusion involves the use of punches and dies, but it differs basically from drawing. In the latter operation the case is formed by pushing the disk and subsequent cups through dies producing tensile stresses; cold extrusion forms the case by compressing the bar and subsequent cups in dies causing a flow of the steel.

Depending upon the operation and design of punches and dies, the metal can be caused to flow over the punch, i.e., in an opposite direction to that of the travel of the punch. It is a typical piercing operation. This is generally termed backward extrusion and the die is generally of a solid bottom type. In the other type known generally as forward extrusion the metal is caused to flow in the same direction as that of the travel of the punch.

For cartridge cases the first step from the cutoff bar is a preforming or sizing operation; the second is backward extruding into a cup, followed by one or two forward extrusions; then a conventional draw, head and taper.

It may be desirable in some cases and it is practicable to substitute a hot forged cup for the first two cold extruding operations, i.e., the preforming and backward extrusion operations.

In the conventional cup and draw process the disk is generally spheroidized annealed—a time-consuming and expensive operation. A conventional annealing or normalizing only is required for extruding.

Mechanical or Hydraulic Presses—Presses for cold extrusion may be either mechanical or hydraulic. Sometimes it is desirable that both types

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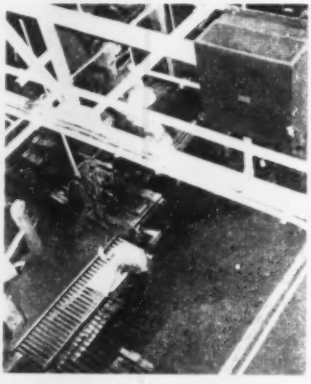

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Borosil is a proven and economical alloy for making Boron additions. Borosil consists of 3 to 4% Boron, 40 to 45% Silicon and the remainder Iron. This diluted Boron alloy is ideally suited for ladle additions.

Borosil is immediately available in following sizes to meet your requirements . . . Standard lump, 2" x Down, ½" x Down, and 8 Mesh x Down.

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MEXICO—Casco S. de R. L., Apartado Postal 1030, Calle Atenas 32-13, Mexico, D. F., Mexico.

SALES AGENTS, NO WAREHOUSES:

NORTHWEST AREA—E. A. Wilcox Company, Arctic Building, Seattle 4, Washington; Phone Mutual 1468.

BIRMINGHAM DISTRICT — Schuler Equipment Company, First National Building, Birmingham, Alabama.

be used in one line. Long stroke presses with large shut heights are required. In cold extrusion—both backward and forward types—the workpiece must be withdrawn from the die. In cold drawing the workpiece is pushed entirely through the die. Therefore in extrusion the stroke of the ram must be great enough for the working portion plus the length of the finished extrusion and the necessary additional clearances for convenient placing of workpiece in the die and its withdrawal. Actual working portion of the punch stroke is relatively small for the length of the resultant extrusion.

In backward extrusion the length of the workpiece is about double the stroke. In forward extrusion the workpiece increases in length three or more times the length of the working stroke, depending upon the proportions of the cup to be extruded. In both forward and backward extrusions, power knockouts are required, the ejection force being approximately 10 per cent of the press tonnage.

Continuous movement of the punch during the working portion of the stroke is necessary. Therefore in hydraulic presses some bonus of pump or accumulator capacity must be provided to minimize "chugging" or intermittent movement of the punch. Such action shows up in visible bands around the extrusion with varying physical characteristics of the surface skin structure.

Experience Limited—Whether continuous power throughout the work stroke such as is obtained with a hydraulic press or a rack type mechanical press is preferable to varying power such as is obtained with a crank type mechanical press has not yet been thoroughly explored. Neither can authentic data on ram speed—whether constant speed or variation in speed during working stroke—be specified by virtue of lack of exhaustive tests and experience.

Impact, expected more in mechanical than in hydraulic presses is not harmful to the extrusion, but is hard on the tools.

There appears to be no limit as to the speed of application of the punch in extrusion, but the faster the extrusion the more heat is generated. The extruded metal flows out of the die ahead of the punch in forward extrusion at a greater speed than that of the punch, this being proportional to the reduction in cross-sectional area of the workpiece and from two to five times as fast.

Surface Preparation Important—Preparation of the surface of the workpiece and its lubrication are important in cold extrusion. The workpiece is given a heavy crystalline metal phosphate coating and impregnated with a high pressure draw lubricant. This operation must be repeated throughout the sequence of extrusions when it is damaged or removed by punch and die wear and by the annealing operations. Lubrication reduces friction on the tools. However, the power required to overcome friction is wasted and the effort should be confined to proper punch and die design to eliminate friction and use the power for the useful purpose of extruding.

Design of punches and dies is probably the most critical consideration. Steel can be extruded with relatively low pressures providing the punch is proportioned to apply its power for flowing the metal instead of overcoming friction, and the die is shaped to avoid friction. The tools naturally must be designed so the pressure used will not cause stresses beyond the yield strength of the punch or die; therefore the highest yield strength steel available should be used. The tools should be designed to permit the displaced metal of the workpiece to flow away from and not contact the punch and die except at substantially a line or point of working contact.

Uses Low Carbon Steels—One of the benefits of extrusion is in obtaining high physical properties in the workpiece with the use of low carbon steels which are generally not suitable for heat treatment to obtain high physicals. Physical properties can be increased as much as three to five or more times that of the original blank. The punch and die design must consider the physical properties that are required throughout the finished piece.

When annealing is required for a subsequent operation, any previous physical properties obtained through cold working are thereby reduced. The forces applied by the cold extrusion operations must not set up stresses in the workpiece beyond the ultimate strength of the material extruded.

In a cartridge case it may be desirable to change the direction of the grain lines at the flange to lessen the chances of shearing the flange by the extractor of the gun. This can readily be accomplished in either extrusion or conventional draw by suitable tool design and perhaps an extra operation.

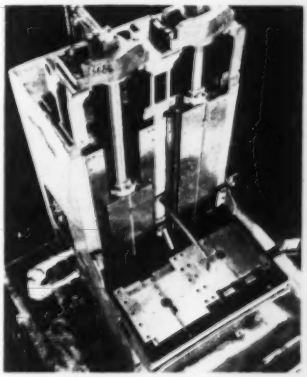
A final low temperature stress relief anneal should be given steel cartridge cases whether made by extrusion or by conventional cup and draw. This not only relieves any locked-up strains but actually improves the physical properties.

Two methods of protecting steel cartridge cases from corrosion are standard. One is the use of phenol-formaldehyde varnish, baked on, and the other is zinc plate, chronac treated. Both are equally effective and some tests have shown them to be superior in corrosion resistance to brass cartridge cases. The varnish is favored, since no critical materials are involved. Further, the varnished case is easier to extract from the gun after firing because of its favorable friction coefficient.

Case Design Studied—Since the manufacture of steel cartridge cases is inherently difficult and requires the use of heavy, long stroke presses, not common in industry, studies are being made of cartridge case designs to overcome these deficiencies. For example, it has been felt for a long time that the recoilless gun cartridge cases could be made essentially by using a preperforated sheet of steel, wrapping it into a cylindrical shape and fastening the lap by welding, brazing or other means, then fastening it similarly to a head piece. This multipiece design is now being developed by several commercial concerns.

Frankford Arsenal is also investigating means to develop a multipiece design for low power weapons, 75mm

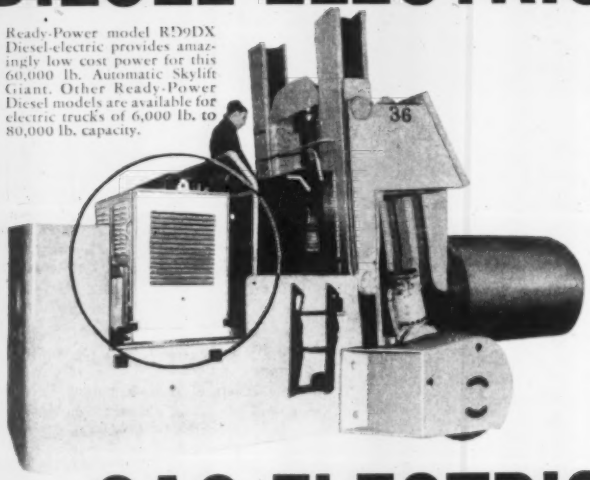
Broaching Machine for Big Jobs



GIANT broaching machine being built by Colonial Broach Co., Detroit, to expedite production of parts for the defense effort ranks among the biggest vertical broaching machines ever built. Overall height is 28½ feet and the dual ram, capable of continuous automatic operation, has a 90-inch stroke for both rams. This feature permits completion of the particular operation for which it is intended in one stroke rather than by two separate operations and machines

DIESEL-ELECTRIC

Ready-Power model RD9DX Diesel-electric provides amazingly low cost power for this 60,000 lb. Automatic Skylift Giant. Other Ready-Power Diesel models are available for electric trucks of 6,000 lb. to 80,000 lb. capacity.



or GAS-ELECTRIC

Equipped with the new Ready-Power gas-electric model H-A, this Lewis-Shepard fork truck can be operated 24 hours a day at peak efficiency. There are gas-electric models for all makes and types of electric trucks.

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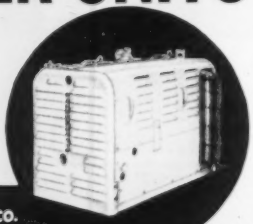


THE READY-POWER CO.

3824 Grand River Ave., Detroit 8, Michigan

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

and 105mm howitzers. A promising design comprises a spirally wrapped overlapping strip steel body portion mechanically attached to a metal headpiece. The joint in the wrapped body portion is unfastened, permitting it to expand when fired, then to contract and easily extract from the gun chamber.

To prepare further for a shortage of presses suitable for cartridge case manufacture over those now in War Reserve, the following steps have been taken:

(1) A survey was made of all Army and Navy facilities which made cases during the war for location of any presses still in their possession or knowledge of where they may be located.

(2) A survey was made by the Used Machinery Dealers Association for location of any presses now on the used machinery market or knowledge of the location of any that were sold by such dealers.

(3) Agreement was reached with the Air Force to transfer to Army Ordnance reserve 33 cartridge case presses that were obtained after the war and placed in Air Force reserve.

Fewer Contractors — Mobilization plans are based upon a much smaller number of contractors than were used during World War II. In general, attempt will be made to assign each potential contractor two or more calibers or types of cases. This plan recognizes the fluidity of changing requirements in war and is intended to allow the shifting of trained manpower between lines as requirements change.

The Navy submitted a list of 12 contractors to which they propose to limit their planning for procurement of cases larger than 20mm. At least eight of these facilities will be shared between the two services. If possible, the Army will add not more than eight facilities to this list. Mobilization assignments are not yet completed.

The chart on Page 76 reveals that during the war we were in production of steel cartridge cases of practically all models. As can also be seen from the black borders on the second column from the left, only a few models were good enough to keep after the war was over. The two notable exceptions were the 40mm and 3-inch A.A., both of which were accepted as the full equal of their brass counterparts. However, procurement responsibility of the 40mm has been transferred to the Navy and the satisfactoriness of the 3-inch is limited, since the gun is now obsolete.

Besides manufacturing difficulties, we are confronted with a fundamental

Here is *Exactly WHY* a V-Belt with CONCAVE SIDES Gives You *Longer Wear!*

To see for yourself how a V-Belt that has *concave sides* is certain to give longer wear, just make this simple test:—

Pick up any V-Belt you have at hand. Bend that belt as it bends around a pulley. As it bends, grip its sides between your fingers. Here is what will happen *everytime*.

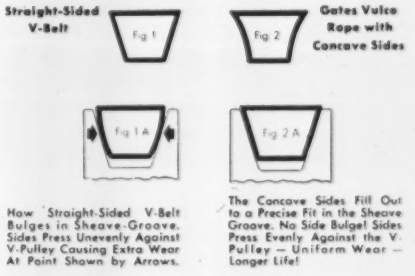
If the V-Belt you are testing has *straight sides*, you can feel those sides *bulge out* as the belt bends. This out-bulge forces the sides of the belt to press *unevenly* against the V-Pulley and you naturally get *concentrated* wear just where the bulge is greatest—as shown in figure 1-A, at right.

Now, make this same test with the belt that is built with *Concave Sides*—the Gates Vulco Rope!

Whereas you felt an *out-bulge* when you bent a belt with straight sides, you find that the *Concave Sides* merely fill out and become *perfectly straight*. The sides therefore press *evenly* against the V-Pulley. This distributes the wear *uniformly* across the *full width* of the belt. Naturally, this means longer belt life and *lower* belt costs for you!

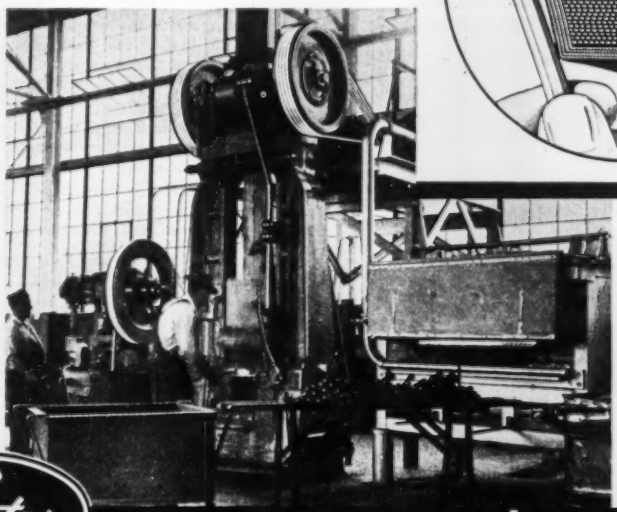
Only V-Belts made by Gates are built with concave sides. Whenever you buy V-Belts, be sure that you get the V-Belt with the Concave Sides—The Gates Vulco Rope!

What Happens When a V-Belt Bends



How Straight-Sided V-Belt Bulges in Sheave-Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear At Point Shown by Arrows.

The Concave Sides Fill Out to a Precise Fit in the Sheave Groove. No Side Bulge! Sides Press Evenly Against the V-Pulley — Uniform Wear — Longer Life!



This drop hammer in the plant of Kortick Manufacturing Company of San Francisco is operated by the Gates Vulco Rope Drives shown. Mr. W. H. Reiman, Plant Supt., says: "...a great improvement in the speed of the return stroke...gives us a positive drive without slip, yet one that absorbs the shock of picking up the ram repeatedly."

A CS-517

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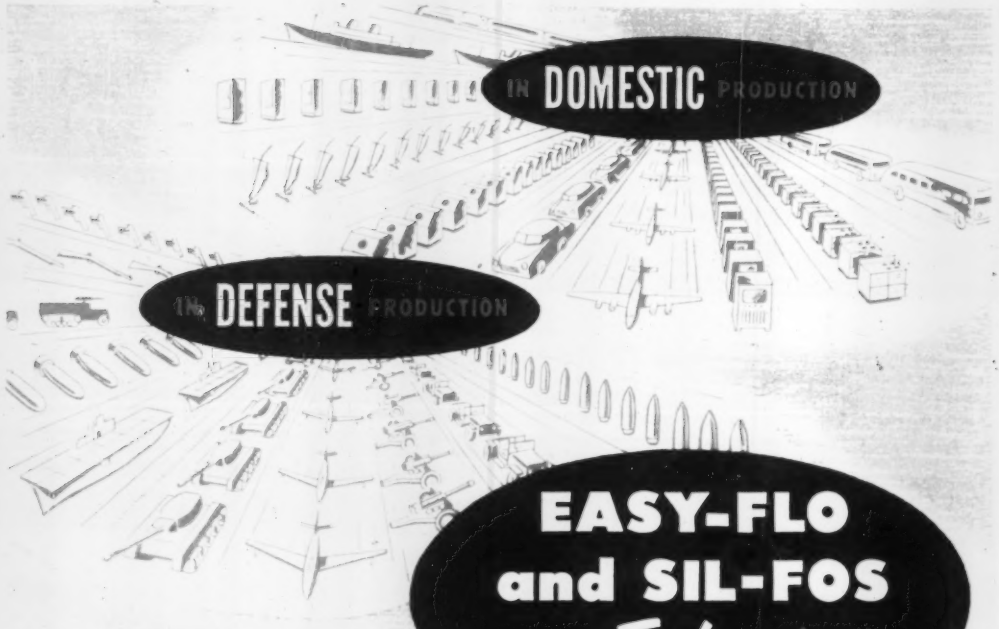

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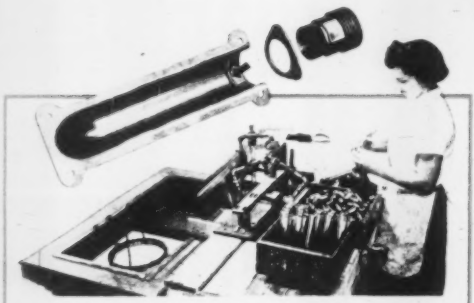

Get any brazing output you need with the ALLOY PREPLACEMENT formula.

The girl in the picture above easily brazes 33 gas meter part assemblies per hour—every one gas-tight and with one-piece strength. It's a typical example of the *alloy preplacement formula* in action—the formula that makes brazing as simple as abc and assures a steady stream of soundly brazed parts. Get the full story about this time, labor, cost-saving formula in BRAZING NEWS No. 54. Write for a free copy today.

Once again these low-temperature silver brazing alloys are doing *double-duty*—helping American Industry meet the biggest two-front production order in history—defense and domestic.

Once again EASY-FLO and SIL-FOS are proving a godsend in enabling manufacturers on both fronts to turn out strong, leak-proof metal joints *at amazing production rates and with push-button simplicity*—and, as a natural result, at rock-bottom costs.

Once again all Handy & Harman's resources are being exerted *to help manufacturers get the utmost benefit of the remarkable speed and economy* inherent in EASY-FLO and SIL-FOS brazing.

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prejudice or resistance to steel as a cartridge case material on the part of the using services. This can be appreciated, for the steel cases supplied during the war were in most calibers definitely inferior in performance to brass cases. This feeling still exists as evidenced by current experience in attempting to standardize a steel case for the 75mm howitzer.

• It is therefore essential that all steel cases submitted for adoption must be superior to brass, so that the services will have no resistance to their use. Current efforts are along that line.

Faster X-Ray Inspection

Commercial development of xeroradiography—a new process that may greatly reduce the use of films and darkrooms in industrial x-ray work—is the object of a joint program just launched by three organizations: Haloid Co., Rochester, N. Y., Battelle Memorial Institute, Columbus, O. and General Electric X-Ray Corp., Milwaukee.

Xeroradiography is expected to make x-ray inspection faster and more economical so that it can be utilized in many more industrial fields for the first time, particularly in smaller foundries, machine shops, general metalworking firms and many other types of plants. It may also provide a tool of considerable value in the inspection of ordnance and other war material, and has possibilities for application in the field of medical diagnosis.

Xeroradiography (pronounced "Zeroradiography") is a fast, low-cost, dry, direct-positive process for producing x-ray images. It is electrostatic, rather than chemical in nature. Reusable plates and low-cost powders take the place of chemicals and films used in conventional radiography. In less than 2 minutes, with a minimum of effort, an industrial inspector would secure a "shadow" picture similar to that on an x-ray negative, showing the internal condition of his product.

Novel Vibration Testing Rig

A unique high-temperature vibration testing rig has been set up at the Union, N. J., plant of Elastic Stop Nut Corp. of America for testing critical vibration requirements of stop nuts, especially those used in aircraft manufacture.

These various types of stop nuts must be designed to operate also at sub-arctic temperatures—whether be-

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DOUBLING UP ON EFFICIENCY . . . With Norton wheels on both ends of your floor or bench stand, you're twice as sure of top performance. Norton has the right combination of abrasive and bond to produce the most satisfactory results on all types of off-hand grinding.

ECONOMY THAT GOES PLACES . . . Keeping pace with the rapidly growing use of portable grinding machines, Norton makes wheels of every type and size for portable applications, from snagging rough castings — to working intricate dies. For general rough grinding, Norton ALUNDUM* or CRYSTOLON* wheels provide fast cutting action and long service life.

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

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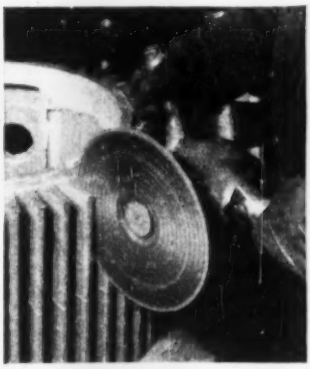
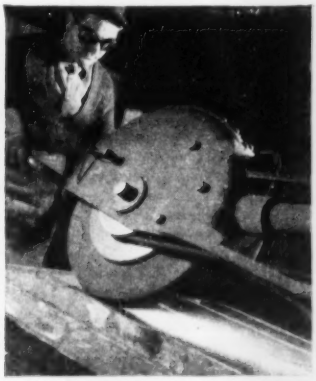
Fast Cutting, Cost Cutting Performance On Every Rough Grinding Job!

FAST WORK IN THE CORNERS . . . If a straight wheel won't do, there's sure to be a Norton cone, cup, plug or mounted point that fits in those hard-to-get-at places. And the standard shapes will take care of just about any situation.

TOPS FOR SAFETY . . . For speed in removing gates and risers from non-ferrous castings, use NORFLEX* reinforced resinoid cut-off wheels. They are equally effective for light snagging and slotting. The sturdy, flexible fabric structure withstands side-grinding, twisting, and bending without breakage.



ALL AROUND THE SHOP . . . Never before have so many users done so many jobs with a single wheel! Norton *Reinforced* Hub Wheels will rough or finish the surface, notch risers on ferrous castings, cut down and smooth up weld beads, do many other jobs. And their strong fabric reinforcement means 2 to 5 times longer wheel life.



ROUGH AND TOUGH . . . Norton's big, high speed wheels cut down the time and labor of heavy-duty swing-frame snagging. Use ALUNDUM wheels for metals of high tensile strength, CRYSTOLON wheels for metals of low tensile strength, in resinoid bonds for both abrasives.

Can YOU Answer These Questions?

What are the three types of bonds commonly used in wheels for portable grinders?

When should you use organic bonded wheels in preference to vitrified bonded?

How does the pressure exerted between wheel and work affect the choice of grade?

What special precautions are needed when grinding magnesium?

How can discoloration be avoided when roughing down stainless steel?

These questions and many more are answered in our illustrated booklet "*Rough Grinding*" (FORM 1405). It contains a lot of facts you need to know—facts which add up to better grinding at lower cost. Get it from your Norton distributor or representative, or write us direct. NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities.

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cause of aircraft altitude or geographical weather conditions. The testing rig is therefore so constructed that it can provide ambient temperatures ranging from sub-arctic to 2000 degrees F. The top range is especially significant in view of the extremely high temperatures at which turbo-jets operate.

The unit permits them to determine whether or not self-locking nuts being developed can ultimately pass existing or proposed Army-Navy test specifications. The rig's flexibility is such that it can simulate conditions more severe than the normal vibration encountered in piston and jet engine operations. At the same time, the machine also allows rigid testing of products before they go into mass production.

The test unit consists of a cam-operated hammer mechanism that produces the required vibrations by both electrical and mechanical means. The drive is furnished by a variable drive motor and speed ranger that is capable of speeds from 590 to 4700 rpm. It is usually run at 2760 rpm and has a range of 8 to 1.

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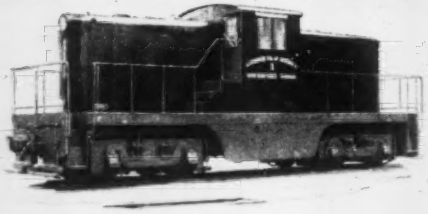

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CALENDAR OF MEETINGS

Denotes first listing in this column

July 13-14, Truck-Trailer Manufacturers Association Inc.: Summer meeting, Edgewater Beach Hotel, Chicago. Association address: 1024 National Press Bldg., Washington 4.

July 23-27, American Association for the Advancement of Science: Annual Gordon Research Conference on Corrosion, New London, N. H. Conference director's address: Dr. W. George Parks, Rhode Island State University, Providence, R. I.

July 30-Aug. 2, American Electroplaters' Society: Annual convention, Statler Hotel, Buffalo. Society address: P.O. Box 168, Jenkintown, Pa.

New Copper Alloy Developed

American Brass Co., Waterbury Conn., has developed Formbrite copper alloy sheet, strip, wire, rod and tube. An unusual combination of physical and fabricating qualities are claimed for the process. Manufacture involves a special procedure of rolling or drawing an annealing brass containing 63 to 90 per cent copper to obtain exceptionally fine grain-size (about 0.008 mm).

Physically the metal is reported to be stronger, harder and "springier" than ordinary drawing brass, yet retains remarkable ductility for deep drawing, forming and cold upsetting. Its harder surface tends to resist abrasion and scratching.

Fine grain structure is said to provide metal with a surface so smooth that a simple buffing operation produces a lustrous finish. Many reports from the field indicate that where parts are to be plated, or even buffed and lacquered, the material effects substantial savings in finishing costs.

Sheet and strip manufactured by this method is offered for practically all drawing brass and purposes. Because of its initial high strength and stiffness, cold fabricated parts acquire added strength and stiffness and frequently can be made of thinner metal than if the usual deep drawing brass were used.

90-Ton Reheat Furnace for J&L

A two-zone reheating furnace, equipped to burn heavy oil or coke oven gas, will be installed at Jones and Laughlin's new South Side Works bar mill, Pittsburgh. Rated capacity will be 90 tons per hour, inside furnace width 33 feet, with an effective hearth length of 60 feet. It will be built by Salem Engineering Division, Salem-Brosius, Salem, O.

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Experienced manpower and modern methods combine to solve even the most difficult bending problems at King Fifth Wheel.

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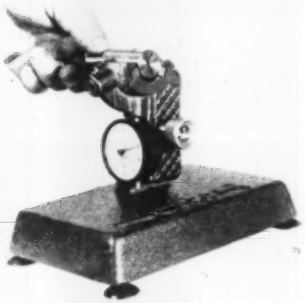
Three-Point Gage Accuracy

Troy Precision Tool Co., P. O. Box 52-39, Welshfield, O., is making available a line of comparator gages featuring three-point controlled accuracy. Rotation of a shaft on a gage automatically effects inspection for out-of-round characteristics or cloverleaf, common in shaft finishing operations. Gages are accurate to within 0.0000250-inch.

Series AO open comparator type gages are available in a series of 21



sizes covering the range from $\frac{3}{8}$ to $\frac{3}{4}$-inch in 3 16-inch increments and from $\frac{3}{4}$ to 6 inches in increments of $\frac{1}{4}$-inch. Each gage is adjustable within its range and can be set by means of hardened, ground and lapped setting masters having accuracy to any desired class of tolerance. Compensation is made in the gages to provide direct reading of shaft diameter, even though it is not measured on a 180 degree plane.

Check No. 1 on Reply Card for more Details

Positive Load Control

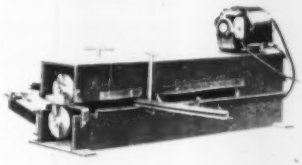
A torque converter, antifriction bearing and air operated, contracting type tandem brake clutches give positive load controls to hoists designated the Iron Workers' Special built by American Hoist & Derrick Co., St. Paul, Minn. Brake linkage between foot pedals and contracting bands is antifriction bearing mounted for easy operation. It is basically a two drum hoist but a third drum and derrick swinger can be added if desired.

Safety features include a back-up brake that engages automatically on reversal of the drive shaft, ratchet rings of forged steel with compression type dogs and overload regulating air valves which permit clutch slippage in case loads become snagged or hung up while being hoisted. Three models are available with single line pulls of 14,000, 18,000 and 25,000 pounds.

Check No. 2 on Reply Card for more Details

Slitters for Small Jobs

Model 2024 or 1624 metal slitting machines introduced by Wilder Mfg. Co., Carmel Valley Route, Monterey, Calif., handle up to 16 or 20 gage mild



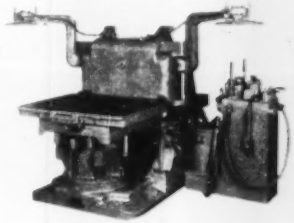
steel depending on the model selected. Possible applications are on sheet or coils for gutter, flashings, downspouts, etc.

In ripping lighter gages it is possible to cut two or more sheets at a time thereby doubling and tripling shop output. Throat depth of 27 inches permits cut to the center of a 4-foot sheet of any length.

Check No. 3 on Reply Card for more Details

Pattern-Draw Machine

Spo Inc., 6194 Grand Division Ave., Cleveland 25, O., announces a model No. 507 jolt rock-over pattern-draw machine. It has a 1500-pound jolt capacity on 80 psi line pressure and a 10 to 20-inch pattern draw stroke. Rock-over table is automatically



locked in both jolt and pattern-draw position by means of the rock-over air cylinders which prevent it from slapping when being jolted or springing during the draw operation. Two air-operated diaphragm type flask clamps hold flask and bottom board securely against the table during the rock-over.

Having open ends the model can handle flasks of any length and up to 32 inches wide. Maximum flask space is 24 inches and minimum 16 inches. It is equipped with an automatic air line lubricator, lubrication fittings and two integrally mounted $1\frac{1}{4}$-inch air vibrators.

Check No. 4 on Reply Card for more Details

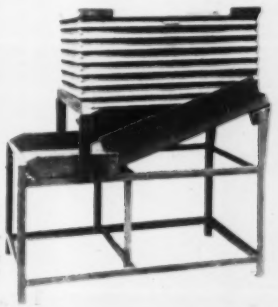
Fire Hazards Eliminated

A closed hydraulic system using either soluble or nonflamable oil instead of hydraulic oil eliminates fire hazards on the shot end of the improved Cast-Master die casting machines made by Miller-Taylor Tool Co., 5005 Euclid Ave., Cleveland, O. Coupled with this safety telescopic fluid transmission assemblies to hydraulic ejection die lock and shot cylinder have been substituted for hose and flexible piping.

Check No. 5 on Reply Card for more Details

Precision Dumping Featured

A dump bottom box developed by Union Metal Mfg. Co., Canton 5, O., permits precision dumping with virtually complete spillage control. When used with the company's positioning



stand it makes possible continuous availability of parts in process at their point of use and at convenient work level. Load is discharged by raising the rear end of the box rather than lowering the lift forks, enabling load to be discharged completely at precisely the height and location desired. Dumping is actuated by means of a hydraulic dumping attachment jointly developed by Union Metal and Clark Equipment Co.

Accompanying photograph shows how box discharges its load into a reservoir tray integral with positioning stand. This means a working sup-

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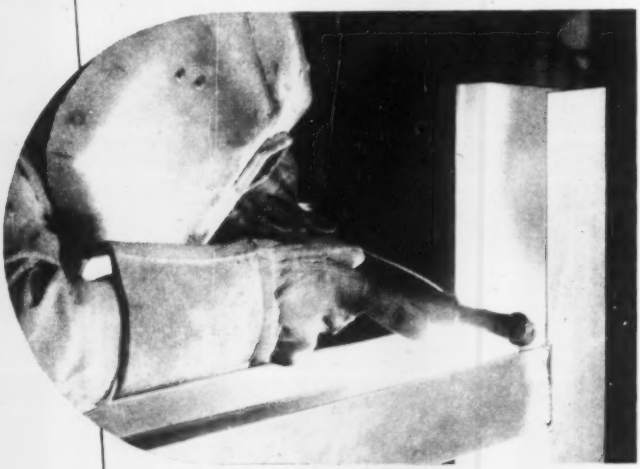


Dependable welds are quickly and economically made on aluminum structural members. Ask your Alcoa Distributor.

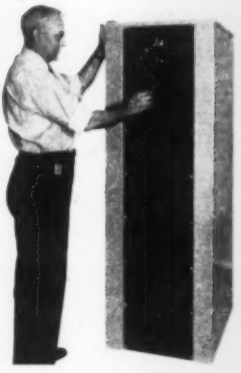
ALCOA FIRST IN ALUMINUM

ply of parts remains during the interval involved in replacing the empty box with a full one. Replacement operation is simplified by the fact that the lift truck forks may be inserted from either side or the back of the box. When box is placed on stand the box bottom descends forming a discharge chute as the truck forks are lowered.

Check No. 6 on Reply Card for more Details

Inductrols Redesigned

A redesigned line of single-phase Inductrols in standard ratings of 9.6 to 24 kva is announced by General Electric Co.'s Transformer & Allied Product Divisions, Schenectady 5, N. Y. They are available for single-



phase circuits, 600 v and below up to 1000 amperes.

With standard controls, the unit can be used for secondary circuit regulation for light and power supplied from the same line. It can also be used in laboratories for controlling voltage in calibrating and testing meters, instruments and instrument transformers; also operating resistance and induction furnaces.

Check No. 7 on Reply Card for more Details

Small Capacity Hoist

An addition to its line of hoists is announced by Wright Hoist Division, American Chain & Cable Co. Inc., York, Pa. The Wright Safeway Army type trolley hoist is made in capacities from $\frac{1}{2}$ to 3 tons and is available with a special load bar and either a pair of two-wheel plain trolleys or one plain and one geared two-wheel trolley.

Plain trolley assembly has chilled tread wheels equipped with ball bearings, steel side plate and connections to load bar. It is adjustable for a wide range of beam sizes and can be changed from plain to geared or vice

MACK TRUCKS

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• There are many good reasons why a Mack is your best truck investment during times like the present. Most important of all is the undisputed fact that Mack trucks outlast them all.

This means that with a Mack truck you can face the uncertainties of the future with assurance...confident that even if trucks should become hard to replace your Mack will see you through...that it will stay on the job delivering dependable service mile after mile and year after year.

Thousands of truck users in World War II found out by actual experience that they were indeed "Lucky to own a Mack." Whatever the future may bring, you'll find that for a sound investment in long-term reliability and operating economy there's no other truck to match a Mack.

Your nearest Mack branch or distributor will give you the full story on what "Built Like A Mack" means in *extra* long life, *extra* strength and stamina, *extra* performance and *extra* dependability.

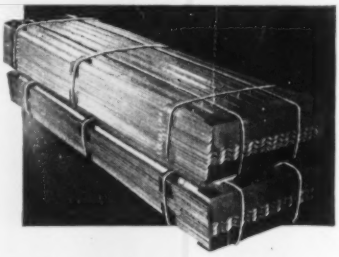
Mack TRUCKS

...outlast them all

Mack Trucks, Empire State Building, New York 1, N.Y. Factories at Allentown, Pa.; Plainfield, N. J.; Long Island City, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

Hauling heavy steel and iron products is one more job where Mack trucks "see you through" with long-lasting dependable operation. This Model LJ Mack serves Hunters Point Steel Co. of Long Island City, N. Y.

Galvanized Corrugated Roofing Sheets are firmly bound with Gerrard 28 ga. Round Steel Strapping. Bundles slide over each other without tearing round straps.



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● Gerrard Steel Strapping does a better tying job. It clinches tightly at the corners, grips evenly, holds firm despite rough handling, and delivers packages to their destination in top notch condition.

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The Gerrard method of strapping saves time, labor and money. Gerrard Strapping alone costs, on the average, about 40% less than any other metal reinforcement. And its use will effect other economies in your operations.

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Gerrard Steel Strapping Company
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Chicago 32, Illinois

USS GERRARD ROUND STEEL STRAPPING

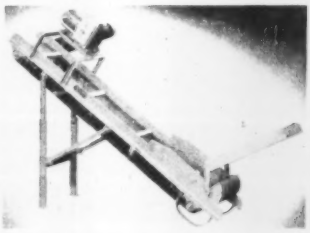
UNITED STATES STEEL

versa readily as both plain and geared mountings are identical. The geared trolley is constructed the same as the plain type except that wheels are furnished with gear rings having cut teeth, pinions with cut teeth handwheel, hand chain and hand chain guide. Thrust rollers are mounted to insure proper alignment of the assembly whether on straight or curved track.

Check No. 8 on Reply Card for more Details

Auxiliary Conveyor Unit

Series S conveyor designed for permanent or semipermanent installation is announced by May-Fran Engineering Inc., 1725 Clarkstone Rd., Cleveland 12, O. It can be moved when working areas or plant layouts change because it does not need to be bolted down. Developed for economical handling of small metal parts such as stampings, castings, borings, turnings and chips, it is useful as an auxiliary unit with a permanent conveyor system to feed or discharge high production items.



Telescopic legs permit discharge end to be lowered or raised as required. In the 4-foot size, the discharge end can be raised from a minimum of 27½ inches to a maximum of 37 inches; in the 6-foot size, from 37 to 57 inches; in the 8-foot size from 40 to 70 inches; in the 10-foot size from 48 to 87 inches; and in the 12-foot size from 56 to 96 inches.

Check No. 9 on Reply Card for more Details

Tractor Sweeper Attachment

A specially designed sweeper for the Ford tractor is being manufactured by Meili-Blumberg Corp., New Holstein, Wis. It is suitable for a variety of applications in industrial plants, warehouses, etc. Broom may be attached or removed within half an hour and may be raised 8 inches by finger tip power hydraulic control. It tilts to adjust the various surfaces and a full length dust hood protects the operator.

Rear power take-off at a fixed ratio to engine speed drives the broom

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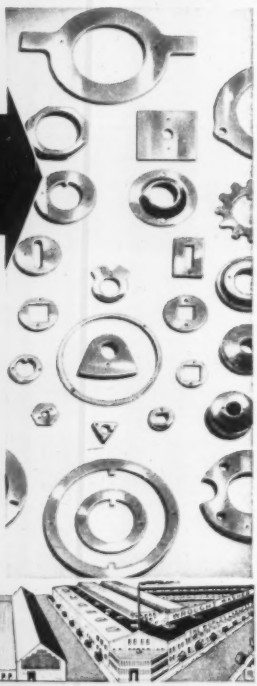

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In exploring the possibilities for the future, it will pay you to consider the many advantages of OSTUCO Steel Tubing. Hundreds of product engineers and manufacturers have found that no other material offers so many outstanding opportunities for improving design, increasing strength, reducing weight, enhancing beauty, and cutting cost.

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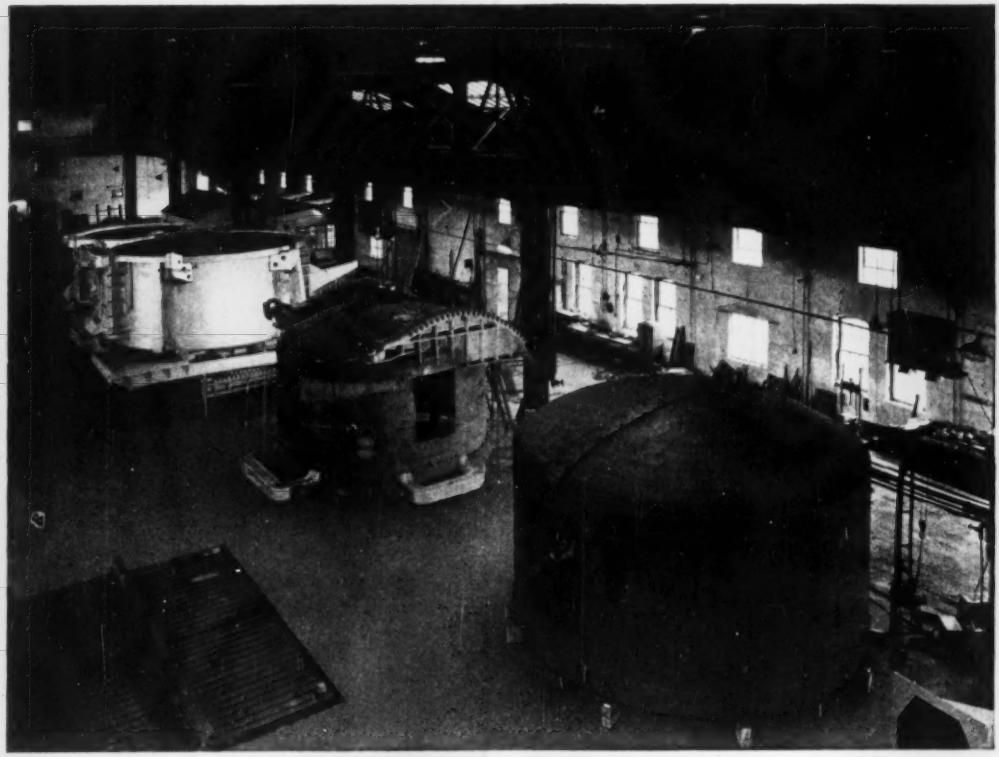


CAPACITY TO BUILD 'EM BIG

Lectromelt builds BIG furnaces that get to work FAST. Our shop assembly practice is responsible: here in our big Pittsburgh plant your Lectromelt* furnace is completely assembled and mechanically operated before we ship it to you. Even the bus bar is pre-assembled. All this saves you time in erection, cuts down installation cost, gets you into production faster.

Lectromelt furnaces stay in production longer, because they have all these built-in features:

top-charging design*—speeds production, cuts electrode consumption, saves power, lengthens lining life; *counter-balanced electrode arms; engineered power supply and regulating apparatus,* designed to stand up to punishing overloads; *oil-bearing mounted superstructure; side-mounted tilting mechanism.

Whatever your melting problem, Lectromelt has the furnace to handle it. Write for your free copy of our Catalog No. 8 to Pittsburgh Lectromelt Furnace Corporation, 323 32nd Street, Pittsburgh 30, Pa.

Manufactured in . . . CANADA: Lectromelt Furnaces of Canada, Ltd., Toronto 2 . . . ENGLAND: Birlec, Ltd., Birmingham . . . SWEDEN: Birlec, Elektkaugnar A. B, Stockholm . . . AUSTRALIA: Birlec, Ltd., Sydney . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa.

*REG. U.S. PAT. OFF.

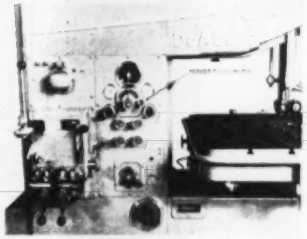
WHEN YOU MELT... MOORE RAPID *Lectromelt*

and provides efficient sweeping at all tractor travel speeds. It sweeps a 5-foot swath at a 30-degree angle depositing debris outside of tractor wheels. Fiber or steel brushes are available.

Check No. 10 on Reply Card for more Details

Greater Bandsawing Accuracy

More sensitive control of the hydraulic table when bandsawing thick steel work sections or when line grinding or diamond sawing vitreous and frangible materials or hardened alloys is possible with a vernier power feed added to the Contour-matic made by DoAll Co., Des Plaines, Ill. The table



infeed knob has an added vernier control at the side which enables the operator to start a cut with a feed rate that will prevent shock or damage to the band tool or the workpiece.

Other knobs on the centralized control panel that save operator's time in setup and adjustment while the machine is running perform the following functions hydraulically: Band tool tensioning, guide post positioning, table tilt, direction and speed of 16-inch table stroke, work feed pressure, and tool speed range infinitely variable between 40 and 10,000 fpm. Hydraulic brakes on both wheels are automatically set if band breaks or when drive motor is shut off.

Check No. 11 on Reply Card for more Details

Rugged Light Conveyor

Complicated and fast-wearing parts are eliminated in the Chain-Veyor made by Southern Engineering Co. Inc., 249 N. First St., Burbank, Calif., to keep maintenance costs low. Unit is extremely flexible and its short radius curves and track sections are easily combined so that changes or additions can be made rapidly.

It will handle loads up to 30 pounds on each pendant spaced at 6-inch intervals or 60-pound loads can be carried at 12-inch intervals when supported by two pendants fitted with cross bar attachment. A special sprocket type drive is used to distribute chain stresses and afford a

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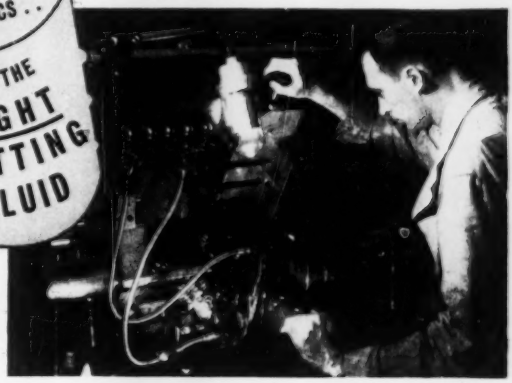


▼ **STUART'S THREDKUT 99 MORE THAN DOUBLES TOOL LIFE PER GRIND.** In threading type 310 stainless male pipe union sections on large automatics, a Milwaukee plant was getting 136 pieces per tool grind. A change to Stuart's ThredKut 99 increased this to 310 pieces per grind —and the cost was 3c less per gallon for oil.

▼ **FORM TOOL LIFE INCREASED 36% WITH STUART'S SPEEDKUT B**—on 6 spindle automatics forming and threading cut-off cap screws of SAE 1060, 10-17 Rockwell C.

▼ **4 TO 1 LESS MACHINING DOWNTIME WITH SPEEDKUT B.** After changing to this Stuart product on an automatic turning out worm gear blanks, the customer reports, ". . . machine now made available to more production within its capacity."

ARE YOU really getting the capacity that was built into your automatic screw machines? In shop after shop, Stuart oils correctly applied have upped production substantially and, as a by-product, have usually improved quality and increased tool life.

It is worth finding out what a Stuart Representative can accomplish for you. Ask to have him call and SEND FOR EDUCATIONAL LITERATURE on cutting fluids for screw machines.

D.A. Stuart Oil Co.
EST. 1865 LIMITED

2735-37 S. Troy St., Chicago 23, Ill.

Sure Stainless Pipe

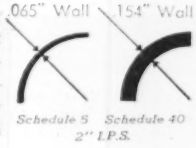
is Tough to Get...

but using light weight *Schedule 5 Pipe* will almost double the supply

—and you pay *less* per foot!

What Schedule 5 Pipe Is—

A light wall pipe, Carpenter *Schedule 5* gives you more feet of pipe for every pound of scarce stainless steel. So you can quickly see how *Schedule 5* increases the amount of pipe available and reduces your cost per foot. Plus the fact that the larger I.D. means increased flow area. These cutaway sections of pipe show the actual difference in wall thickness.



How Schedule 5 Reduces Costs

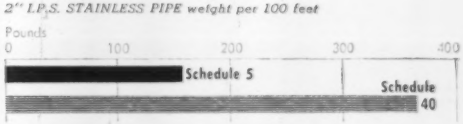
First saving is 40% to 50% on the cost of your pipe. And, because *Schedule 5* lets you use the next smaller pipe size, you reduce by as much as 25% your costs of valves, fittings, etc. Carpenter *Schedule 5* Pipe often permits the use of the next smaller pipe size, because of its larger inside diameter.

How It Hooks Up With Tube

This pipe is easily adapted to use with existing lines of tubing or Schedule 40 and 10 pipe, using simple connectors available from several manufacturers.

Why It Means More Pipe

You get *more feet of pipe* for every pound of material with Carpenter *Schedule 5* Stainless Pipe. And we don't have to tell you how important it is to get *more steel* from every pound of nickel and chrome these days.



How It Resists Corrosion

You get the full corrosion resistance of the stainless analysis with Carpenter *Schedule 5* Pipe. It is made in standard A.I.S.I. analyses of stainless steel.

What Pressures It Handles

All sizes of Carpenter *Schedule 5* Pipe will handle 150 psi working pressures with a good margin of safety. Sizes up to 1½" will safely handle considerably higher working pressures. Where high pressures are involved, however, Schedule 40 may be required.

Data Sheets Give You More information about this opportunity to get more stainless pipe for essential uses. Write for a copy now. Under today's conditions, Carpenter *Schedule 5* Stainless Pipe may help solve several big problems, including "When can I get the pipe I need?"

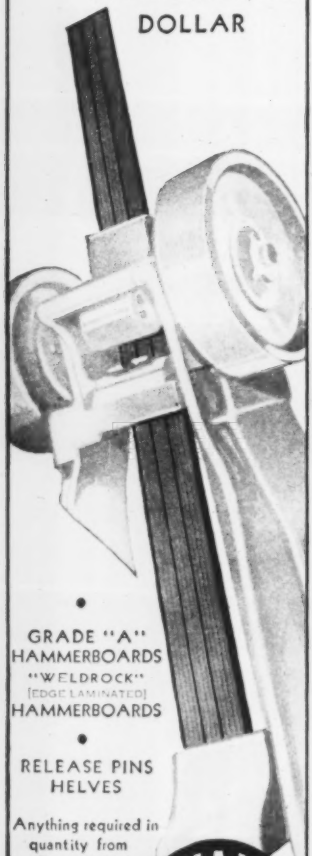
THE CARPENTER STEEL COMPANY
Alloy Tube Division, Union, N. J.
Export Department: Carpenter Steel Co., Reading, Pa., "CARSTEELCO"

Carpenter
STAINLESS TUBING & PIPE

Analysis · Tolerance · Finish
- guaranteed on every shipment

IRWIN

MORE FORGINGS *per* HAMMERBOARD DOLLAR



GRADE "A" HAMMERBOARDS
"WELDROCK" [EDGE LAMINATED] HAMMERBOARDS
RELEASE PINS
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Anything required in quantity from Pennsylvania's hard woods—maple and cherry

IRWIN 50 YEARS of Quality

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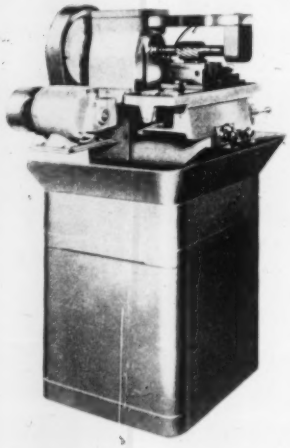
straight line pull and permit operation in either direction. Mounting is made at 90-degree corner of the conveyor line. Instant adjustment of conveyor speeds of from 3 to 9 feet per minute while unit is in operation is made possible by the varispeed drive which is on all standard power units.

Check No. 12 on Reply Card for more Details

Small Parts Milling

Light production machine for fast milling of small parts requiring close limits and fine finish is a development of Viking Industries, 220 Montague St., Rockford, Ill. No. 618 hydraulic Speed-Mill features an automatic milling cycle, hydraulic feeds, small amount of floor space and maximum rigidity for cuts using rotary cutters up to 6-inch diameter.



Machine cycles within a range of 10 seconds to 18 minutes. Hydraulic feed through valve selection is infinite $\frac{3}{8}$ to 24 inches per minute over a 7-inch maximum length of cut. A separate $\frac{3}{4}$-inch motor assures positive steady power to the spindle. A standard $\frac{1}{2}$-hp motor drives the hydraulic motor and coolant pump off the same shaft. Coolant system is supplied from an 8 gallon coolant reservoir. Maximum travel for the 6 x 18-inch table under power is $8\frac{1}{2}$ inches.

Check No. 13 on Reply Card for more Details

Oscillating Trough Conveyor

Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill., is producing an oscillating trough type conveyor called the Flexmount for the handling of a variety of loose bulk materials at moderate capacities. Steel chips and turnings are handled with

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HIGH CARBON
STAINLESS
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You draw the Shape
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—the way you want it for your production—whether it's ALL of your product, or only a part.
Cross-sectional areas up to .250" square; widths to $\frac{3}{8}$"; width-to-thickness ratio not exceeding 6 to 1.

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PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE

virtually no wear of metal troughing. Design features use of a one-piece metal trough with high sides, supported on one-piece flexible members which function as springs in absorbing the energy of the trough movement at each end of the stroke.

Conveyor trough is normally 4 inches deep and can be furnished in standard widths of 8 to 24 inches made of 10 or 12 gage steel, stain-

less or corrosion resisting steel or other material. Motion is imparted to trough by a roller-bearing, constant-stroke eccentric. Oscillation at the natural frequency of the mounts reduces the reaction forces on the drive to a minimum and requires only the horsepower necessary to convey the material. Lengths up to 100 feet can be furnished and dividers can be installed to convey several materials simultaneously. Discharge is possible at any desired point.

Check No. 14 on Reply Card for more Details

Controls Air-Fuel Ratio

An air-fuel ratio controller announced by Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa., is applicable to oil or gas firing, or to dual-fuel furnaces. It meters both fuel and air flow for maximum accuracy of control. Models are supplied to operate an electric or pneumatic control valve. Wide range of proportional band and reset control actions makes it easy to adjust the control to the needs of the furnace to which it is applied.

Major subassemblies are standardized and readily replaceable. Unit comes in a single instrument case which fits into standard panel cutouts. Ratio extends from 50 per cent deficiency to 100 per cent excess air.

Check No. 15 on Reply Card for more Details

Better Machinery Control

Improved starting and control of machine tools, presses and similar equipment is provided by the combination Life-Linestarter available from Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa. Unit is available in NEMA sizes 1 through 5 with ratings up to 200 hp, 440 v polyphase.

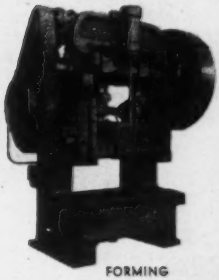
Dirt, oil and splashing coolant are

a full line . . .
PRODUCTION MACHINERY

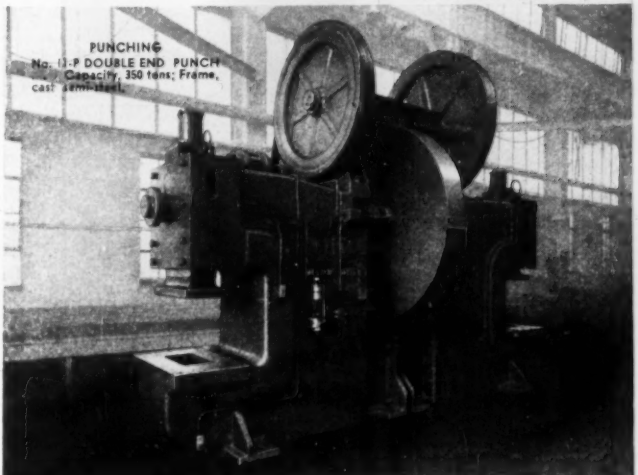
FORGING
No. 24 BULLDOZER . . . Capacity, 80 tons; Stroke, 18 in.; Strokes per min., 10; Frame, cast semi-steel.

BENDING
No. 22 EYEBENDER . . . Capacity 1½" round bar hot on 2" mandrel; ¾" round bar cold on 1¼" mandrel. 12 S.P.M.

The machines shown here are typical of the equipment built by WILLIAMS-WHITE to meet the particular needs of industry. If you are interested in machines similar to the ones illustrated, write us giving as much information as possible and we will send complete specifications.



FORMING
No. 6 G-48 GAP FRAME PRESS . . . Capacity, 125 tons; Strokes per min., 35; Frame, semi-steel casting.



PUNCHING
No. 11-P DOUBLE END PUNCH . . . Capacity, 350 tons; Frame, cast semi-steel.

MAKERS OF PRECISION PRODUCTION MACHINERY FOR NEARLY 100 YEARS

WILLIAMS-WHITE & CO.
MOLINE, ILLINOIS

kept out of the type 12 enclosure by using a continuous neoprene gasket and external mounting brackets. Breaker is operated by a slam-proof, self-indicating external handle but enclosure must be opened to reset overload relays.

Check No. 16 on Reply Card for more Details

Holds Sheet Metal Parts

To hold sheet metal parts preparatory to riveting, Aviation Developments Inc., Burbank, Calif., offers Avdel sheet grippers. They operate without the use of springs or special tools and sheet metal parts are drawn closely together. Grippers are available in hole sizes of 3/32, 1/8, 5/32 and 3/16-inch.

Check No. 17 on Reply Card for more Details

Manual Starter

Class 2510 type A fractional horsepower manual starter designed to control and protect single phase alternating and direct current motors of 1 hp or less is announced by Square D Co., Milwaukee 12, Wis. Both single and double-pole devices are available. General purpose, water and dust-tight and explosion-resistant enclosers as well as open-type starter are available.

Check No. 18 on Reply Card for more Details

Redesigned Respirator

Mine Safety Appliances Co., Pittsburgh 8, Pa., offers the Comfo respirator for protection of workers in industries where toxic or fibrosis-producing dusts are hazards. It features a new type mineral wool filter that requires less than half the filter area and offers only half the breathing resistance of previous models with same dust collecting efficiency.

Check No. 19 on Reply Card for more Details

Primer Wets Rust

Rustbond primer, developed by Carboline Co., St. Louis 5, Mo., contains a vehicle that makes it capable of locking paint film to surfaces having adherent rust. Its wetting action is evident by its ability to reduce the splitting of top vinyl finishes to nearly zero. The coating also reduces portions of the rust particles from iron oxide to iron.

Check No. 20 on Reply Card for more Details

Holder for Curved Marking

A holder for simplifying the stamping of curved line markings on the ends of small rounded parts is available from M. E. Cunningham Co., Pittsburgh, Pa. Model SH-15 curved line holder is made of Mecco safety steel to prevent spalling or mushrooming. Type can be set in a partial or complete circle. Type is held in position by a plastic insert which expands when set screw in the center of the holder is tightened down against it.

Check No. 21 on Reply Card for more Details

Low Carbon Steel Strip

To simplify the brazing of steel joints, American Silver Co. Inc., Flushing, N. Y., introduces Braze-Clad low carbon steel strip. It is clad with silver brazing alloy on one or both sides in any thickness ratio and melting range to suit particular requirements. Joint surfaces are prediffused with silver brazing alloy to eliminate need of such preplacements as wire rings, sheet washers and blanks.

Check No. 22 on Reply Card for more Details

Electric Indicator, Printer

Gilmore Technical Associates, Cleveland 3, O., introduces a new electric indicator and printer for use with devices for measurement of displacement, force, weight and pressure. The printer can be controlled remotely or automatically. It gives either a continous or individual record by tape or card.

Check No. 23 on Reply Card for more Details

Heat Resistant Lacquer

United Lacquer Mfg. Corp., Everett, Mass., has developed C 5173, a one-coat, heat resistant lacquer for use where temperatures up to 300 degrees are encountered. It may be applied by spraying and air dries in 15 minutes.

Check No. 24 on Reply Card for more Details

Stamps Soft Metals

For stamping soft metals and mild steel, Numberall Stamp & Tool Co., Staten Island 12, N. Y., offers a new numbering and lettering detail press. All spacing adjustments, including table release are located in front of the press. Model 141 is hand operated; model 142, air operated and model 143, motorized.

Check No. 25 on Reply Card for more Details

Marks Convex Surfaces

Acromark Co., Elizabeth, N. J., announces a new numbering tool that uses ordinary straight line flat surface marking type with an insert segment and becomes a tool for marking convexed surfaces such as rods, bars, tubes, shafts, etc. Each piece of type is of standard body width and is easily removed from the holder, but due to the segment piece blank that is placed between each piece of type, a curvature is obtained conforming to surface being marked.

Check No. 26 on Reply Card for more Details

Sine Fixture Key

Jergens Tool Specialty Co., Cleveland, O., announces a new sine fixture key that eliminates five operations that were necessary in milling fixture key slots. The stemmed construction of the S key requires a bored hole instead of the standard milled fixture key slot.

Check No. 27 on Reply Card for more Details

Indexing Drill Selector

A new indexing drill selector for fractional size drills from 1/16 to 1/2-inch is announced by W. A. Horejsi Co., Minneapolis, Minn. It may be mounted on the drill press column or on the wall. Drill sizes are marked on the side of the case which revolves on the supporting bracket.

Check No. 28 on Reply Card for more Details

Transparent Cutting Fluid

Tuff-Kut, a water soluble transparent cutting fluid is introduced by Lubricants Inc., Detroit 2, Mich. It is smokeless and odorless and contains no petroleum oil. The fluid also gives protection against rust on machined parts. It is diluted with ordinary tap water.

Check No. 29 on Reply Card for more Details

Bronze Bearings, Bushings

Bronze Bearings Inc., Cranford, N. J., offers an improved line of bronze bearings and bushings. They may be plain, flanged, split or any combination of these types. Finishes range from an accurate machine finish to a semifinish.

Check No. 30 on Reply Card for more Details

Grinding Wheel Bond

XL, a new grinding wheel bond, has been developed by Chicago Wheel & Mfg. Co., Chicago, Ill., for tungsten carbide tool sharpening. Wheels are recommended for offhand or precision grinding of carbide tools on milling cutters, broaches, reamers, counterbores and other similar applications.

Check No. 31 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Helpful Literature

73. Geared Drives
Michigan Tool Co.—Illustrated bulletins 501, 509, 511, 512, 513, 514, 516, 517 and 522 deal with applications of Cone-Drive speed reducers and geared drives in materials handling field. Data are included on various sizes and types.

74. Electron Drill
Elox Corp. of Michigan—Data are given in 2-page illustrated bulletin on the Elox electron drill which will cut 0.04 to 1-in. diameter holes in hardened steel, and will remove broken taps or drills without damaging workpiece.

75. Bending Aluminum Sheet
Kaiser Aluminum & Chemical Sales, Inc.—11 x 17-in. chart suitable for shop posting gives recommended minimum radii for proper bending of aluminum sheet in various gages of commonly used alloys.

76. Pyrometers
Claud S. Gordon Co.—4-page illustrated folder lists specifications for several Xactemp pyrometers for high and low temperature indications. Various types of thermocouples available are covered in detail.

77. Small Gear Hobber
Hamilton Tool Co.—Designed expressly for high speed, continuous hobbing of small precision spur gears, pinions and special tooth forms, No. 00 gear hobber is described in detail in 4-page illustrated bulletin H-00-49.

78. Gearing
Gear Specialties Inc.—6-page illustrated folder shows 15 different types of fractional horsepower gearing that can be obtained in from 12 to 96 diametral pitch. Two useful standards charts are included to help in selecting proper units.

79. Wet-Blasting Units
Cro-Plate Co.—4-page illustrated folder depicts and describes wet-blasting units that have no moving parts and which are designed for high production rate deburring, descaling, stock removal and general surface finishing.

80. Centralized Lubrication
Farval Corp. — 8-page illustrated booklet "Studies in Centralized Lubrication" depicts six applications of Farval systems which have resulted in production time, manpower, lubricant, and bearing savings.

81. Power Plant Equipment
Elliott Co.—16-page illustrated bulletin Q-14 presents information on power plant and industrial equipment including turbines, blowers, condensers, heaters, tube cleaners, motors, generators and motor-generator sets.

82. Dust Suppressor
Whiting Corp.—Details of the new bag type dust suppressor for industrial dusts, fumes and smoke are outlined in 4-page illustrated bulletin FY-169. Used on foundry cupolas, it removes all gases from top of stack and suppresses more than 95 per cent of solids. Unit has been approved by the Los Angeles Smog Control Board.

83. Power Factor Meter
General Electric Co., Apparatus Dept.—16-page illustrated bulletin GEA-5469 is descriptive of G-E hook-on power factor meter which gives readings accurate to within 0.05 power factor in frequency range of 50 to 90 cycles. It has effective scale length of 13.5 in. and can be used without interrupting electrical service.

84. Corrosion Resistance
Carpenter Steel Co.—16-page illustrated "Corrosion Notebook" contains data on corrosion resistance of various types of stainless tubing and pipe. Described are general types of corrosion such as intergranular, galvanic, atmospheric and pitt-type.

85. Carbon Dioxide Recorder
Hays Corp.—4-page illustrated publication No. 51-553 covers application of automatic CO_2 recorder and describes orsat principle of operation. Temperature compensation and self-leveling are explained and installation and sampling are described. Selector chart is guide to mountings and various models.

86. Bucket Loaders
George Haiss Mfg. Co.—8-page illustrated bulletin No. H 75-77 lists features and specifications of Haiss model 75, 77 and 75-SBC bucket loaders with capacity of 3 cu yd per minute. Tire and crawler-equipped units handle sand, stone, coal, soil and even oyster shells.

87. Flat-Top Conveyor Chain
Chain Belt Co.—20-page illustrated bulletin 51-60 is handbook of flat-top conveyor chain and gives complete engineering and application data. Ideally suited for conveying packaged or bottled goods, this smooth top, flexible chain is available in widths and pitches to meet any need. Information is included on sprockets also.

FOR MORE INFORMATION USE ONE OF THESE CARDS . .

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12	32	52	72	92
13	33	53	73	93
14	34	54	74	94
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HELPFUL LITERATURE

88. Bar-Pipe-Wire Tongs

Heppenstall Co.—4-page illustrated folder "How Diamond Chain Co. Cut Warehousing Costs by Using Heppenstall Tongs" describes the integrated materials handling system employing specially designed tongs and racks in conjunction with overhead cranes and power trucks. Bars, pipe, coils or wire and finished chain are handled.

89. Electrical Brushes

General Electric Co.—28-page illustrated bulletin GEA-5597 is entitled "Carbon Brushes for Electrical Equipment." Discussed are fundamental considerations given to design, application and manufacture of carbon brushes. Also covered are brush terminology, physical characteristics and types of brushes, grades and grade recommendations, and tips on brush replacement.

90. Cleaning Solvent

Haas MILLER Corp. — "Immunol Makes Water Rustproof, Instant-Wetting and Solvent" is title of 12-page booklet which discusses characteristics, uses, method of application and qualities of this solvent which affords rust protection and forms detergent.

91. Tachometer

Metron Instrument Co.—Technical data sheet No. 42P describes new series 42P three-range, single head, fixed type tachometer indicators. Total speed range is 40 or 50 to 1, based on readings down to 1/10-full scale. Accuracy is 1 per cent of full scale on any range. Scales can be calibrated in various units.

92. Sand Blast Equipment

Pangborn Corp.—12-page illustrated bulletin No. 1110 gives application and operating data on custom and unit type installations of Hydro-Sand blast and core knockout units. In addition to use for core knockout and casting cleaning operations, equipment can be used to clean heat exchanger tubes, etc.

93. Positioning Equipment

F. T. Griswold Mfg. Co.—12-page illustrated catalog No. 10 shows how accuracy of positioning and linear measurement in machining operations and inspection can be increased. Described are OPL dividing head, new indexing table and Scan-A-Scale. Latter is precise direct reading linear positioning device which can be used to increase machine tool flexibility.

94. Heat Transfer Surfaces

Modine Mfg. Co. — 4-page illustrated bulletin ID-151 covers variety of specialized heat transfer surfaces developed for such equipment as solvent recovery, intercooling, regeneration, gas separation and liquefaction, heat economizing and drying. Included are types with as much as 300 to 350 cu ft of surface per cubic foot of volume.

95. Retaining Rings

Waldes Kohinoor, Inc.—20-page illustrated bulletin No. 8 covers series of Truarc retaining rings that form artificial shoulders for positioning and retaining machine parts on shafts or in housings. Data includes allowable thrust loads, force required to flatten bowed type rings, gap widths and speed limits.

96. Bearing Maintenance

Anti-Friction Bearing Distributors Association—20-page illustrated booklet "Installation-Maintenance-Removal of Anti-Friction Bearings" is guide to servicing, selection and application of ball, roller and needle bearings. "Bearing Maintenance Report" is regularly issued publication which deals with all phases of this subject. Included is file order folder to simplify collection of bearing reference data.

97. Metal Working Presses

American Steel Foundries, Elmes Engineering Div.—6-page illustrated bulletin No. 1011 depicts and describes Elmes pipeless metal working presses. Main hydraulic circuit has no piping, and all high-pressure fluid is conducted through short, direct passages drilled in structural parts.

98. Consultation Service

Gulf Oil Corp.—20-page illustrated brochure explains periodic consultation service available to industrial users of petroleum products including lubricants, fuels and rust preventives. Methods are outlined to show how production can be increased, waste reduced and fire and accident hazards eliminated.

99. Machine Tools

Cincinnati Milling Machine Co. & Cincinnati Grinders Inc.—48-page illustrated publication No. M-1712 presents features and specifications of Cincinnati machines for milling, broaching, cutter sharpening, grinding, lapping and flame hardening. Use of Cimcool cutting fluid is also covered.

100. Sleeve Bearings

Johnson Bronze Co. — Two data sheets offer detailed data on load carrying capacity for various types of sleeve bearing materials and information on corrosion of bearings made with steel, lead, copper-lead, tin, bronze and aluminum bases.

FOR MORE INFORMATION USE ONE OF THESE CARDS . .

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11	31	51	71	91
12	32	52	72	92
13	33	53	73	93
14	34	54	74	94
15	35	55	75	95
16	36	56	76	96
17	37	57	77	97
18	38	58	78	98
19	39	59	79	99
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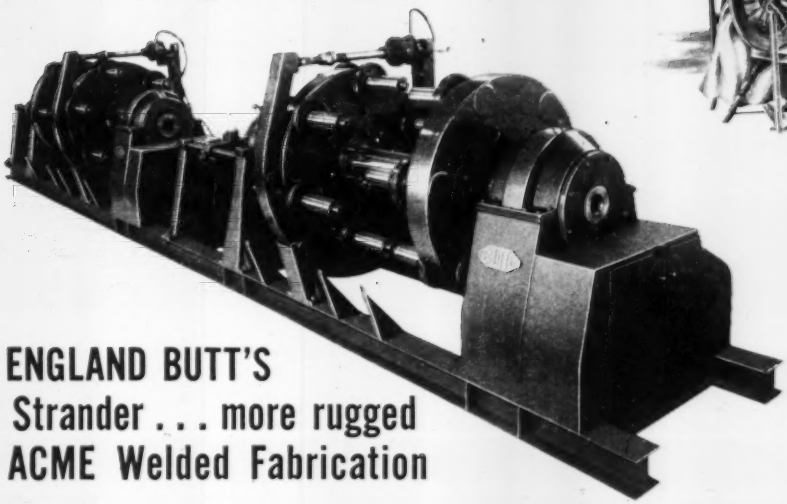
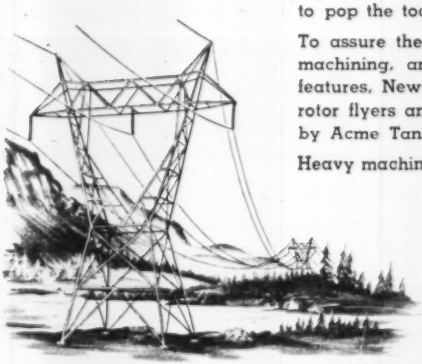
to light a million homes



NEW ENGLAND BUTT'S
Rigid Strander . . . more rugged with ACME Welded Fabrication

Fifty-four separate spools of wire feed this high-speed rigid-type strander—designed and built by the New England Butt Company of Providence, Rhode Island—result: mile upon mile of heavy power cable, to travel cross-country carrying low-cost electric power to thousands of communities . . . thread from a giant spinning wheel to pop the toasters and light the lamps in a million homes.

To assure the rigidity necessary for high-speed operation, to reduce machining, and to make it possible to incorporate unique design features, New England Butt engineers specify that bases, gear boxes, rotor flyers and frame members for all their stranders be all-welded by Acme Tank & Welding.



Heavy machinery manufacturers, like New England Butt, specify Acme for bases and components because they've learned to rely on Acme's engineering skill, experience, and complete facilities to meet their specifications exactly, no matter what the size or design of their weldment. Let us show you how an Acme weldment can improve your product.

Write Acme today: send your blue prints or a rough sketch . . . you'll receive a prompt quotation.

ACME
TANK and WELDING
DIVISION of THE UNITED TOOL & DIE CO.
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- A.S.M.E. Qualified Welders • National Board Approved
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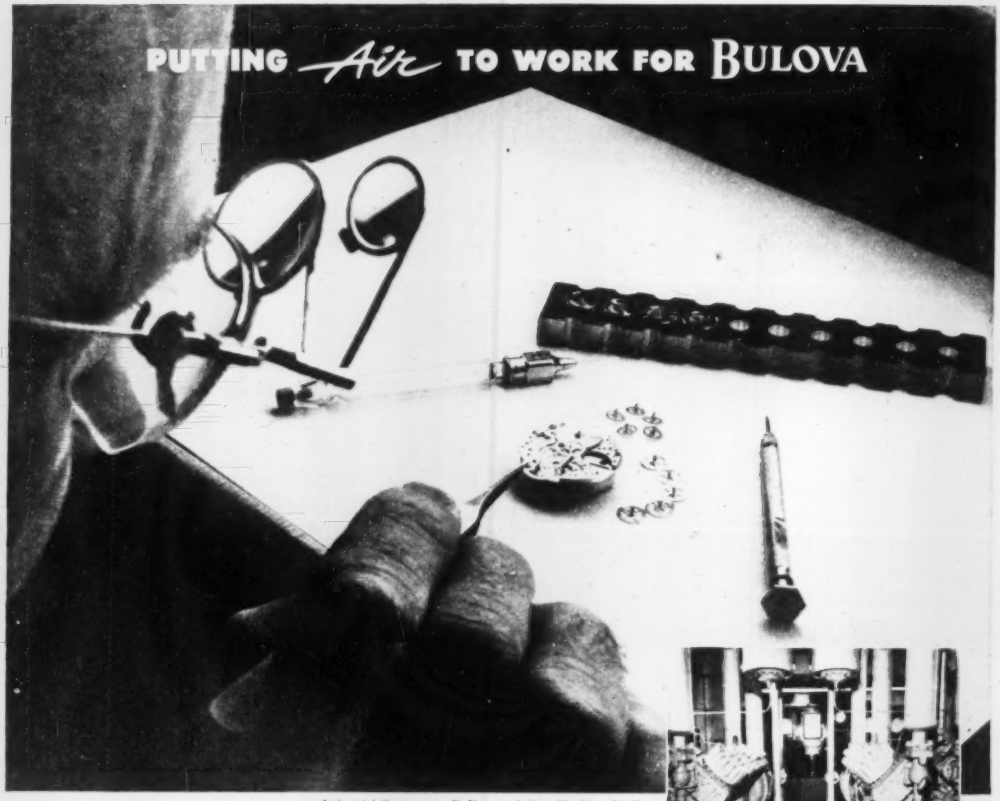
- Underwriters Label and Inspection Service • Navy Approved



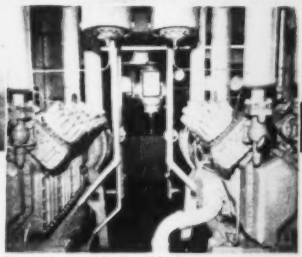
Industrial Contractor: P. Kretzer & Son, Flushing, N. Y.
Air Conditioning by: Abbott, Lester & Co., New York, N. Y.

HOW TO MAKE TIME IN A CONTROLLED ATMOSPHERE

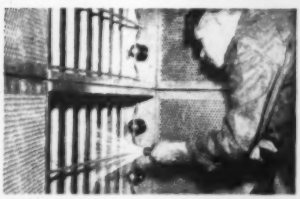
Airborne dirt and moisture are poison to precision instruments. Even the tiniest specks and droplets help inaccuracies or corrosion get a toehold and grow during assembly processes.

That is why Bulova used Westinghouse Air Conditioning and PRECIPITRON®, that cleans air electronically . . . to make air work *for* them through the entire plant. Production and assembly of uniformly precise movements are safeguarded . . . and fingers that touch finely finished surfaces don't perspire and cause corrosion.

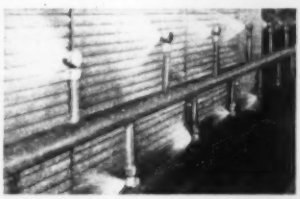
You can *put air to work*, too—with air conditioning, air cleaning or air moving equipment. Call the Westinghouse Air Conditioning Distributor in your classified phone directory, or write Westinghouse Electric Corporation, Air Conditioning Division, Hyde Park, Boston 36, Massachusetts.



Westinghouse Air Conditioning compressors are hermetically sealed. No belts or pulleys to break or get out of adjustment. 2 to 100 ton capacities.



PRECIPITRON is three times more efficient than the best mechanical air cleaner. Dirt particles are held on collector plates until washed away.



Air washing aids in precise humidity control . . . helps cool in summer, reduces static electricity in winter to keep dust off clean surfaces.

YOU CAN BE SURE...IF IT'S

Westinghouse

J-80216

The Market Outlook

KOREAN peace negotiations are injecting a slight note of uncertainty in the steel and metalworking industries, now producing at a record pace. Metalworking executives agree with Washington that the armament program must be pushed ahead as projected—truce or no truce. The defense program combined with a heavy capital expenditures program will maintain an active economy. At the same time, industry men believe that a cease-fire agreement would result in a psychological letdown by the public and may take the pressure off demand for hard civilian goods. Some retailers report that demand for new autos and domestic appliances has slackened and ascribe the dip to the truce negotiations. Gray market steel prices have eased as result of the peace conversations.

SHIFT TO CMP—Few metalworking people expect the materials supply to become much freer should a cease-fire agreement be reached. Steel, copper and aluminum still are expected to be tight through the remainder of this year. Steel consumers have been converting their DO-rated orders to the Controlled Materials Plan and by weekend most of them were over the hump. With July 7 the official deadline, last week witnessed a deluge of tonnage placed for September, the last month of the quarter still open for scheduling of carbon grades. Most of this came from the larger consumers who did not receive their allotments as quickly as the smaller consumers, primarily because the larger users' applications are more difficult to process.

DEMAND-SUPPLY—Unrated consumers see a tighter squeeze in September after schedules are established by the mills later this week on products requiring a 45-day lead time. On products in tightest supply—plates, shapes, bars and hot-rolled sheets—substantial arrearages will be carried over at the end of August. This combined with a high percentage of set-asides will leave little free tonnage in September. Cold-rolled sheets are a little easier and producers say some free tonnage will be available in September.

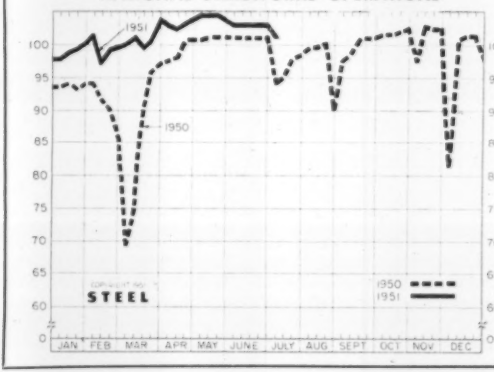
SCRAP—Basic open hearth scrap at dealers' yards is being allocated at some centers. This reflects the growing stringency at some mills and the desire by the government to keep scrap generated locally from being shipped outside the district.

PRICES—Price rollbacks on industrial products are out of the picture for July at least and possibly longer. Congressional action in extending the Defense Production Act for 31 days clipped plans of the Office of Price Stabilization to fix new price ceilings on many industrial products July 2. New ceilings on lead scrap and aluminum scrap and secondary ingot were set just before the extension and prices on these commodities were rolled back to a more normal relationship with primary prices.

Nickel bearing steel prices are advanced to reflect the 6-cent a pound increase in nickel, made effective June 1. Other ferrous metal prices are firm at established ceilings. STEEL's weighted index on finished steel holds at 171.92 and compares with 156.69 while the arithmetical price composite holds at $106.32 and compares with $94.36. Pig iron composites are unchanged from the preceding week and compare with those for the like week a year ago as follows: No. 2 foundry, $52.54 and $46.47; basic, $52.16 and $45.97; malleable p'g iron, $53.27 and $47.27. Steelmaking scrap composite holds at $44 and compares with $36.83 a year ago.

PRODUCTION—Steel mill operators maintained continuous operations over the July 4 holiday to meet the urgent demands for coke, pig iron and steel. Ingot operations eased only 2 points to 101 per cent of capacity, equivalent to production of about 2,020,000 tons of ingots and steel for castings. Output during the holiday week last year was only 1,765,200 tons.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended July 7	Change	Same Week 1950	Same Week 1949
Pittsburgh	97.5	— 1.5*	94.5	53.5
Chicago	106.5	+ 0.5	98	68.5
Mid-Atlantic	99	— 3	96.5	68
Youngstown	105	0	105	50
Wheeling	93.5	— 5	93	68
Cleveland	98.5	— 2	52	64.5
Buffalo	104	0	104	85
Birmingham	100	0	100	100
New England	91	+ 4	60	38
Cincinnati	106	+ 9	90	72
St. Louis	84.5	—14.5	78	73.5
Detroit	101.5	+ 0.5*	104	91
Western	103.5	— 1.5	98	79.5
Estimated national rate	101	— 2	94	60

Based on weekly steelmaking capacity of 1,999,034 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950; 1,843,516 tons for 1949.

* Change from revised rate for preceding week.

The Metalworking Outlook—p. 35 Production-Engineering News—p. 71

Composite Market Averages

	July 5 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.—100)	171.92	171.92	171.92	156.69	112.04
Index in cents per lb.	4.657	4.657	4.657	4.245	3.035
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$106.32	$106.32	$106.32	$94.36	$64.45
No. 2 Fdry. Pig Iron, GT	52.54	52.54	52.54	46.47	28.17
Basic Pig Iron, GT	52.16	52.16	52.16	45.97	27.50
Malleable Pig Iron, GT	53.27	53.27	53.27	47.27	28.79
Steelmaking Scrap, GT	44.00	44.00	44.00	36.83	19.17

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	July 5 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.45	2.50
Bars, H.R., Chicago	3.70	3.70	3.70	3.45	2.50
Bars, H.R., del. Philadelphia	4.20	4.20	4.20	3.93	2.86
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.10-15	3.10
Shapes, Std., Pittsburgh	3.65	3.65	3.65	3.40	2.35
Shapes, Std., Chicago	3.65	3.65	3.65	3.40	2.35
Shapes, del. Philadelphia	3.91	3.91	3.91	3.86	2.48
Plates, Pittsburgh	3.70	3.70	3.70	3.50	2.50
Plates, Chicago	3.70	3.70	3.70	3.50	2.50
Plates, Coatesville, Pa.	4.15	4.15	4.15	3.60	2.50
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.50	2.50
Plates, Claymont, Del.	4.15	4.15	4.15	3.60	2.50
Sheets, H.R., Pittsburgh	3.60-75	3.60-75	3.60-75	3.35	2.425
Sheets, H.R., Chicago	3.60	3.60	3.60	3.35	2.425
Sheets, C.R., Pittsburgh	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Chicago	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Detroit	4.55	4.55	4.55	4.30	3.375
Sheets, Galv., Pittsburgh	4.80	4.80	4.80	4.40	4.05
Strip, H.R., Pittsburgh	3.75-4.00	3.75-4.00	3.75-4.00	3.25-.50	2.35
Strip, H.R., Chicago	3.50	3.50	3.50	3.25	2.35
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.15-.50	3.05
Strip, C.R., Chicago	4.90	4.90	4.90	4.30	3.15
Strip, C.R., Detroit	4.35-5.60	4.35-5.60	4.35-5.60	4.35-.95	3.15
Wire, Basic, Pittsburgh	4.85-5.10	4.85-5.10	4.85-5.10	4.50	3.05
Nails, Wire, Pittsburgh	5.90-6.20	5.90-6.20	5.90-6.20	5.50	3.75
Tin plate, box, Pittsburgh	$8.70	$8.70	$8.70	$7.50	$5.25

SEMIFINISHED

Billets, forging, Pitts. (NT)	$66.00	$66.00	$66.00	$63.00	$47.00
Wire rods, 5/8-⅜", Pitts.	4.10-.30	4.10-.30	4.10-.30	3.85	2.30

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$47.00	$29.00
Basic, Valley	52.00	52.00	52.00	46.00	28.00
Basic, del. Phila.	56.49	56.49	56.49	49.44	29.93
No. 2 Fdry. Pitts.	52.50	52.50	52.50	46.50	28.50
No. 2 Fdry. Chicago	52.50	52.50	52.50	46.50	28.50
No. 2 Fdry. Valley	52.50	52.50	52.50	46.50	28.50
No. 2 Fdry. Del. Phila.	56.99	56.99	56.99	49.94	30.43
No. 2 Fdry. Birm.	48.88	48.88	48.88	42.38	24.88
No. 2 Fdry. (Birm.)del. Cin.	55.33	55.33	55.33	48.08	28.94
Malleable Valley	52.50	52.50	52.50	46.50	28.50
Malleable, Chicago	52.50	52.50	52.50	46.50	28.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	60.00	33.00
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	175.00	140.00*

* Delivered, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt, Pitts.	$45.00	$45.00	$45.00	$40.00	$20.00
No. 1 Heavy Melt, E. Pa.	43.50	43.50	43.50	33.00	18.75
No. 1 Heavy Melt, Chicago	43.50	43.50	43.50	37.50	18.75
No. 1 Heavy Melt, Valley	45.00	45.00	45.00	41.50	20.00
No. 1 Heavy Melt, Cleve.	44.00	44.00	44.00	39.50	19.50
No. 1 Heavy Melt, Buffalo	44.00	44.00	44.00	39.00	19.25
Rails, Rerolling, Chicago	52.50	52.50	52.50	47.50	22.25
No. 1 Cast, Chicago	49.00*	49.00*	49.00*	44.50	20.00

* F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn. Connlsvl.	$14.75	$14.75	$14.75	$14.25	$8.75
Beehive, Fdry. Connlsvl.	17.50	17.50	17.50	15.50	9.50
Oven, Fdry., Chicago	21.00	21.00	21.00	21.00	14.35

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	22.50	14.375
Zinc, E. St. Louis	17.50	17.50	17.50	15.00	8.25-9.50
Lead, St. Louis	16.80	16.80	16.80	10.80	9.35
Tin, New York	106.00	106.00	136.00	80.125	52.00
Aluminum, del.	19.00	19.00	19.00	17.50	15.00
Antimony, Laredo, Tex.	42.00	42.00	42.00	24.50	14.50
Nickel, refinery, duty paid	56.50	56.50	56.50	48.00	35.00

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$54.00	$54.50	$55.00	$55.50
Brooklyn,N.Y.,del.		58.69	59.46	
Newark,del.	56.74	57.24	57.74	58.24
Philadelphia,del.	56.49	56.99	57.49	57.99
Birmingham District				
AlabamaCity,Ala. R2	48.38	48.88		
Birmingham R2	48.38	48.88		
Birmingham S9	48.38	48.88		
Woodward,Ala. W15	48.38	48.88		
Cincinnati,del.		55.33		
Buffalo District				
Buffalo R2	52.00	52.50	53.00	
Buffalo H1	52.00	52.50	53.00	
Tonawanda,N.Y. W12	52.00	52.50	53.00	
No.Tonawanda,N.Y. T9		52.50	53.00	
Boston, del.	61.63	62.13	62.63	
Rochester,N.Y., del.	54.74	55.24	55.74	
Syracuse,N.Y.,del.	55.72	56.22	56.72	
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary,Ind. U5	52.00	....	52.50	....
IndianaHarbor,Ind. I-2	52.00	....	52.50	....
So.Chicago,Ill. W14	52.00	52.50	52.50	....
So.Chicago,Ill. Y1	52.00	52.50	52.50	....
So.Chicago,Ill. U5	52.00	....	52.50	53.00
Milwaukee, del.	53.97	54.47	54.47	54.97
Muskegon,Mich.,del.	....	58.20	58.20	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland P2	52.00	52.50	52.50	....
Akron, del. from Cleve.	54.49	54.99	54.99	55.49
Lorain,O. N3	52.00	....	....	53.00
Duluth I-3	....	....	52.50	....
Erie,Pa. I-3	52.00	52.50	52.50	53.00
Everett,Mass. E1	51.75	52.25	....	....
Fontana,Calif. K1	58.00	....	58.50	....
Geneva,Utah G1	52.00*	52.50	....	....
Seattle,Tacoma,Wash.,del.	....	60.35	....	....
Portland,Oreg.,del.	....	60.35	....	....
LosAngeles,SanFrancisco,del.	59.85	60.35	....	....
GraniteCity,Ill. G4	53.00	54.40	54.90	....
St.Louis,del. (inc. tax)	54.66	55.16	55.66	....
Ironton,Utah C11	52.00	52.50	....	....
LoneStar,Tex. L6	48.00	*48.50	48.50	....
Minnequa,Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
NevilleIsland,Pa. P6	....	52.50	52.50	53.00
Pitts.,N.&S. sides, Ambridge, Aliquippa,del.	....	53.74	53.74	54.24
McKeesRocks, del.	....	53.49	53.49	53.99
Lawrenceville, Homestead, McKeesport,Monaca,del.	....	54.00	54.00	54.50
Verona,del.	....	54.48	54.48	54.98
Brackenridge,del.	....	54.72	54.72	55.22
Bessemer,Pa. U5	52.00	....	52.50	53.00
Clairton,Rankin,So.Duquesne,Pa. U5	52.00	....	....	....
McKeesport,Pa. N3	52.00	....	....	53.00
Monessen,Pa. P7	54.00	....	....	....
Sharpsville,Pa. S6	....	....	52.50	53.00
Steelton,Pa. B2	54.00	54.50	55.00	55.50
Swedeland,Pa. A3	56.00	56.50	57.00	57.50
Toledo,O. I-3	52.00	52.50	52.50	53.00
Cincinnati,del.	57.21	57.71	....	....
Troy,N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard,O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown K5	52.00	....	....	53.00
Mansfield,O.,del.	56.43	56.93	56.93	57.43

* Low phos, southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson,O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

NiagaraFalls,N.Y. P15	$88.00
Keokuk,Iowa, Openhearth & Fdry. frt. allowed K2	92.50
Keokuk, OH & Fdry., 12½ lb piglets, 16% Si, frt. allowed K2	95.50
Wenatchee, Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos, semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 x 6)

Lyles,Tenn. T3	$66.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton,Pa. B2	60.00
Philadelphia, delivered	63.12
Troy,N.Y. R2	60.00

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Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, July 5, 1951 cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ....$79.00
Munhall,Pa. U5 ....52.00

INGOTS, Alloy (NT)
Detroit R7 ....$54.00
Fontana,Calif. K1 ....80.00
Houston,Tex. S5 ....62.00
Midland,Pa. C18 ....54.00
Munhall,Pa. U5 ....54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$56.00
Clairton,Pa. U5 ....56.00
Ensley,Ala. T2 ....56.00
Fairfield,Ala. T2 ....56.00
Fontana,Calif. K1 ....75.00
Gary,Ind. U5 ....56.00
Johnstown,Pa. B2 ....56.00
Lackawanna,N.Y. B2 ....56.00
Munhall,Pa. U5 ....56.00
So.Chicago,Ill. U5 ....56.00
So.Duquesne,Pa. U5 ....56.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$66.00
Buffalo R2 ....66.00
Canton,O. R2 ....66.00
Clairton,Pa. U5 ....66.00
Cleveland R2 ....66.00
Conshohocken,Pa. A3 ....73.00
Detroit R7 ....69.00
Ensley,Ala. T2 ....66.00
Fairfield,Ala. T2 ....66.00
Fontana,Calif. K1 ....85.00
Gary,Ind. U5 ....68.00
Geneva,Utah G1 ....66.00
Houston,Tex. S5 ....74.00
Johnstown,Pa. B2 ....66.00
Lackawanna,N.Y. B2 ....66.00
LosAngeles B3 ....85.00
Munhall,Pa. U5 ....66.00
Seattle B3 ....85.00
So.Chicago R2,U5,W14 ....66.00
So.Duquesne,Pa. U5 ....66.00
So.SanFrancisco B3 ....85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$70.00
Buffalo R2 ....70.00
Canton,O. R2 ....70.00
Canton,O. (29) T7 ....66.00
Conshohocken,Pa. A3 ....77.00
Detroit R7 ....73.00
Fontana,Calif. K1 ....85.00
Gary,Ind. U5 ....70.00
Houston,Tex. S5 ....78.00
Ind.Harbor,Ind. Y1 ....70.00
Johnstown,Pa. B2 ....70.00
Lackawanna,N.Y. B2 ....70.00
LosAngeles B3 ....90.00
Massillon,O. R2 ....70.00
Midland,Pa. C18 ....70.00
Munhall,Pa. U5 ....70.00
So.Chicago R2,U5,W14 ....70.00
So.Duquesne,Pa. U5 ....70.00
Struthers, O. Y1 ....70.00
Warren,O. C17 ....70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 ....$82.00
Cleveland R2 ....82.00
Fontana,Calif. K1 ....110.00
Gary,Ind. U5 ....82.00
Massillon,O. R2 ....82.00
So.Chicago,Ill. R2 ....82.00
So.Duquesne,Pa. U5 ....82.00

SHEET BARS (NT)
Fontana,Calif. K1 ....$89.00

SKELP
Aliquippa,Pa. J5 ....3.45
Munhall,Pa. U5 ....3.35
Warren,O. R2 ....3.35
Youngstown R2, U5 ....3.35

WIRE RODS
AlabamaCity,Ala. R2 ....4.10
Buffalo W12 ....4.10
Cleveland A7 ....4.10
Donora,Pa. A7 ....4.10
Fairfield,Ala. T2 ....4.10
Fontana,Calif. K1 ....4.90
Houston,Tex. S5 ....4.50
Johnstown,Pa. B2 ....4.10
Joliet,Ill. A7 ....4.10
LosAngeles B3 ....4.90
Minnequa,Colo. C10 ....4.35
Monessen,Pa. P7 ....4.10
No.Tonawanda,N.Y.B11 ....4.10
Pittsburg,Calif. C11 ....4.75
Portsmouth,O. P12 ....4.30
Roebling, N. J. R5 ....4.20
So.Chicago,Ill. R2 ....4.10
SparrowsPoint,Md. B2 ....4.20
Sterling,Ill. (4) N15 ....4.10
Struthers,O. Y1 ....4.10
Torrance,Calif. C11 ....4.90
Worcester A7 ....4.40

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ....4.45
Lackawanna,N.Y. B2 ....4.45
Munhall,Pa. U5 ....4.45
So.Chicago,Ill. U5 ....4.45

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ....3.60
Aliquippa,Pa. J5 ....3.65
Bessemer,Ala. T2 ....3.65
Bethlehem,Pa. B2 ....3.70
Clairton,Pa. U5 ....3.65
Fairfield,Ala. T2 ....3.65
Fontana,Calif. K1 ....4.25
Gary,Ind. U5 ....3.65
Geneva,Utah G1 ....3.65
Houston,Tex. S5 ....4.05
Ind.Harbor,Ind. I-2 ....3.65
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.25
Lackawanna,N.Y. B2 ....3.70
LosAngeles B3 ....4.25
Minnequa,Colo. C10 ....4.10
Munhall,Pa. U5 ....3.65
Niles,Calif.(22) P1 ....4.85
Phoenixville,Pa. P4 ....4.95
Portland,Oreg. O4 ....4.50
Seattle B3 ....4.30
So.Chicago,Ill. U5, W14 ....3.65
So.SanFrancisco B3 ....4.20
Torrance,Calif. C11 ....4.25
Weirton,W.Va. W6 ....3.90

Alloy Stand. Shapes
Clairton,Pa. U5 ....4.35
Fontana,Calif. K1 ....5.55
Munhall,Pa. U5 ....4.35
So.Chicago, Ill. U5 ....4.35

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 ....5.50
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa. (34) B2 ....5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.10
Gary,Ind. U5 ....5.50
Geneva,Utah G1 ....5.50
Ind.Harbor,Ind. I-2 ....5.50
Ind.Harbor,Ind. Y1 ....6.00
Johnstown,Pa. B2 ....5.50
Lackawanna,N.Y.(14)B2 ....5.50
LosAngeles B3 ....6.05
Munhall,Pa. U5 ....5.50
Seattle B3 ....6.10
So.Chicago,Ill. U5 ....5.50
So.SanFrancisco B3 ....6.00
Struthers,O. Y1 ....6.00

Wide Flange
Bethlehem,Pa. B2 ....3.70
Clairton,Pa. U5 ....3.65
Fontana,Calif. K1 ....4.65
Lackawanna,N.Y. B2 ....3.70
Munhall,Pa. U5 ....3.65
So.Chicago,Ill. U5 ....3.65

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ....5.50
Lackawanna,N.Y. B2 ....5.50
Munhall,Pa. U5 ....5.45
So.Chicago,Ill. U5 ....5.45

BEARING PILES
Munhall,Pa. U5 ....3.65
So.Chicago,Ill. U5 ....3.65

PLATES, High-Strength Low-Alloy
Aliquippa,Pa. J5 ....5.65
Bessemer,Ala. T2 ....5.65
Clairton,Pa. U5 ....5.65
Cleveland J5, R2 ....5.65
Conshohocken,Pa. A3 ....5.90
Fairfield,Ala. T2 ....5.65
Fontana,Calif.(30) K1 ....6.25
Gary,Ind. U5 ....5.65
Geneva,Utah G1 ....5.65
Ind.Harbor,Ind. I-2 ....5.65
Ind.Harbor,Ind. Y1 ....6.15
Johnstown,Pa. B2 ....5.65
Munhall,Pa. U5 ....5.65
Pittsburgh J5 ....5.65
Seattle B3 ....6.55
Sharon,Pa. S3 ....5.70
So.Chicago,Ill. U5 ....5.65
SparrowsPoint,Md. B2 ....5.65
Warren,O. R2 ....5.65
Youngstown Y1 ....6.15

PLATES, Open-Hearth Alloy
Caymont,Del. C22 ....4.85
Coatesville,Pa. L7 ....5.25
Conshohocken,Pa. A3 ....5.05
Fontana,Calif. K1 ....5.70
Gary,Ind. U5 ....4.75
Johnstown,Pa. B2 ....4.75
Munhall,Pa. U5 ....4.75
Sharon,Pa. S3 ....5.20
So.Chicago,Ill. U5 ....4.75
SparrowsPoint,Md. B2 ....4.75

FLOOR PLATES
Cleveland J5 ....4.75
Conshohocken,Pa. A3 ....4.75
Harrisburg,Pa. C5 ....5.95
Ind.Harbor,Ind. I-2 ....4.75
Munhall,Pa. U5 ....4.75
So.Chicago,Ill. U5 ....4.75

PLATES, Ingot Iron
Ashland,e.l.(15) A10 ....3.65
Ashland,lcl(15) A10 ....4.45
Cleveland,e.l. R2 ....4.50
Warren,O.e.l. R2 ....4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ....3.70
Aliquippa,Pa. J5 ....3.70
Ashland,Ky.(15) A10 ....3.70
Bessemer,Ala. T2 ....3.70
Clairton,Pa. U5 ....3.70
Claymont,Del. C22 ....4.15
Cleveland J5, R2 ....3.70
Coatesville,Pa. L7 ....4.15
Conshohocken,Pa. A3 ....4.15
Fairfield, Ala. T2 ....3.70
Fontana,Calif.(30) K1 ....4.30
Gary,Ind. U5 ....3.70
GraniteCity,Ill. G4 ....4.40
Geneva,Utah G1 ....3.70
Harrisburg,Pa. C5 ....4.95
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1 ....3.70
Johnstown,Pa. B2 ....3.70
Lackawanna,N.Y. B2 ....3.70
Minnequa,Colo. C10 ....4.50
Munhall,Pa. U5 ....3.70
Pittsburgh J5 ....3.70
Seattle B3 ....4.60
Sharon,Pa. S3 ....3.95
So.Chicago,Ill. U5, W14 ....3.70
SparrowsPoint,Md. B2 ....3.70
Steubenville,O. W10 ....3.70
Warren,O. R2 ....3.70
Weirton,W.Va. W6 ....4.00
Youngstown R2, U5, Y1 ....3.70

PLATES, Carbon A. R.
Fontana,Calif. K1 ....5.45
Geneva,Utah G1 ....4.85

PLATES, Wrought Iron
Economy,Pa. B14 ....8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ....3.70
Aliquippa,Pa. J5 ....3.70
Alton,Ill.(11) L1 ....3.95
Atlanta,Ga. A11 ....4.25
Bessemer,Ala. T2 ....3.70
Buffalo R2 ....3.70
Canton,O. R2 ....3.70
Clairton,Pa. U5 ....3.70
Cleveland R2 ....3.70
Detroit R7 ....3.85
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 ....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 ....3.70
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1 ....3.70
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.30
Lackawanna,N.Y. B2 ....3.70
LosAngeles B3 ....4.40
Midland,Pa. C18 ....4.20
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 ....5.05
N.Tonawanda,N.Y. B11 ....3.70
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 ....3.70
Portland,Oreg. O4 ....4.65
Seattle B3, W14 ....4.45
So.Chicago R2, U5, W14 ....3.70
So.Duquesne,Pa. U5 ....3.70
So.SanFran.,Cal. B3 ....4.45
Struthers,O. Y1 ....3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 ....3.85
Youngstown R2, U5 ....3.70

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ....3.70
Atlanta A11 ....4.25
Johnstown,Pa. B2 ....3.70
Lackawanna,N.Y. B2 ....3.70
Niles,Calif. P1 ....5.05
Portland,Oreg. O4 ....4.65
SanFrancisco S7 ....4.85

BAR SIZE ANGLES; H.R. CARBON
Bethlehem,Pa. B2 ....3.90

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....4.30
Buffalo R2 ....4.30
Canton,O. R2 ....4.30
Canton,O.(29) T7 ....3.95
Clairton,Pa. U5 ....4.30
Detroit R7 ....4.45
Ecorse,Mich. G5 ....4.65
Fontana,Calif. K1 ....5.35
Gary,Ind. U5 ....4.30
Houston,Tex. S5 ....4.70
Ind.Harbor,Ind. I-2, Y1 ....4.30
Johnstown,Pa. B2 ....4.30
KansasCity, Mo. S5 ....4.90
Lackawanna,N.Y. B2 ....4.30
LosAngeles B3 ....5.35
Massillon,O. R2 ....4.30
Midland,Pa. C18 ....4.30
So.Chicago R2,U5,W14 ....4.30
S.Duquesne,Pa. U5 ....4.30
Struthers,O. Y1 ....4.30
Warren,O. C17 ....4.30
Youngstown U5 ....4.30

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 ....4.55
Gary,Ind. U5 ....4.55
Youngstown U5 ....4.55

BARS & SMALL SHAPES, H. R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ....5.55
Bessemer,Ala. T2 ....5.55
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.55
Cleveland R2 ....5.55
Fairfield,Ala. T2 ....5.55
Fontana,Calif. K1 ....6.60
Gary,Ind. U5 ....5.55
Ind.Harbor,Ind. I-2 ....5.55
IndianaHarbor,Ind. Y1 ....6.05
Johnstown,Pa. B2 ....5.55
Lackawanna, N. Y. B2 ....5.55
LosAngeles B3 ....6.25
Pittsburgh J5 ....5.55
Seattle B3 ....6.30
So.Duquesne,Pa. U5 ....5.55
So.SanFrancisco B3 ....6.30
Struthers,O. Y1 ....6.05
Youngstown U5 ....5.55

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....4.55
BeaverFalls,Pa. M12,R2 ....4.55
Buffalo B5 ....4.60
Camden,N.J., P13 ....5.00
Carnegie,Pa. C12 ....4.55
Chicago W18 ....4.55
Cleveland A7, C20 ....4.55
Detroit P17 ....4.70
Donora,Pa. A7 ....4.55
Elyria,O. W8 ....4.55
FranklinPark,Ill. N5 ....4.55
Gary,Ind. R2 ....4.55
GreenBay,Wis. F7 ....4.55
Hammond,Ind. L2, M13 ....4.55
Hartford,Conn. R2 ....5.10
Harvey,Ill. B5 ....4.55
LosAngeles R2 ....6.00
Mansfield,Mass. B5 ....5.10
Massillon,O. R2, R8 ....4.55
Monaca,Pa. S17 ....4.55
Newark,N.J. W18 ....5.00
Plymouth,Mich. P5 ....4.80
Pittsburgh J5 ....4.55
Putnam,Conn. W18 ....5.10
Readville,Mass. C14 ....5.10
St.Louis,Mo. M5 ....4.95
So.Chicago,Ill. W14 ....4.55
SpringCity,Pa.(5) K3 ....5.00
Struthers,O. Y1 ....4.55
Waukegan,Ill. A7 ....4.55
Youngstown F3, Y1 ....4.55

BARS, Cold-Finished Alloy
Ambridge, Pa. W18 ....5.40
BeaverFalls,Pa. M12 ....5.40
Bethlehem,Pa. B2 ....5.40
Buffalo B5 ....5.45
Camden,N.J. P13 ....5.80
Canton,O. R2 ....5.40
Canton,O.(29) T7 ....4.90
Carnegie,Pa. C12 ....5.40
Chicago W18 ....5.40
Cleveland A7 ....5.45
Cleveland C20 ....5.40
Detroit P17 ....5.55
Donora,Pa. A7 ....5.45
Elyria,O. W8 ....5.40
Gary,Ind. R2 ....5.40
Hammond,Ind. L2, M13 ....5.40
Hartford,Conn. R2 ....5.85
Harvey,Ill. B5 ....5.40
Lackawanna,N.Y. B2 ....5.40
Mansfield,Mass. B5 ....5.85
Massillon,O. R2, R8 ....5.40
Midland,Pa. C18 ....5.40
Monaca,Pa. S17 ....5.40
Newark,N.J. W18 ....5.75
Plymouth,Mich. P5 ....5.60
So.Chicago,Ill. R2, W14 ....5.40
Struthers,O. Y1 ....5.40
Warren,O. C17 ....5.40
Waukegan,Ill. A7 ....5.45
Worcester,Mass. A7 ....5.75
Youngstown F3, Y1 ....5.40

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ....4.75
ChicagoHts.(3,4) I-2 ....4.50
Franklin,Pa.(3,4) F5 ....4.75
FortWorth,Tex.(26) T4 ....4.85
Huntngtn,W.Va.(3) W7 ....5.50
Marion,O.(3) M11 ....4.75
Moline,Ill.(3) R2 ....3.80
Tonawanda (3,4) B12 ....4.75
Williamsport(3) S19 ....5.00
Williamsport(4) S19 ....5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt) U1 ....15.00
Dover,(Eng.Bolt) U1 ....13.50
Dover(Wrgt.Iron) U1 ....12.25
Economy,Pa.(S.R.) B14 ....9.60
Economy,Pa.(D.R.)B14 ....11.90
Economy,(Staybolt)B14 ....12.20
McK.Rks.(Staybolt) L5 ....14.50
McK.Rks.(S.R.) L5 ....9.60
McKRks.(D.R.) L5 ....13.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ....3.70
Alton,Ill.(6) L1 ....3.70
Atlanta A11 ....4.25
Buffalo R2 ....3.70
Cleveland R2 ....3.70
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 ....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 ....3.70
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1 ....3.70
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.30
LosAngeles B3 ....4.40
Milton,Pa. B6 ....4.20
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 ....5.05
N.Tonawanda,N.Y. B11 ....3.70
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 ....3.70
Portland,Oreg. O4 ....4.65
Seattle B3 ....4.45
So.Chicago R2, U5, W14 ....3.70
So.SanFran.,Cal. B3 ....4.45
Struthers,O. Y1 ....3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 ....3.85
Youngstown R2, U5 ....3.70

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ....4.75
ChicagoHts.(3,4) I-2 ....4.50
Franklin,Pa.(3,4) F5 ....4.75
FortWorth,Tex.(26) T4 ....4.85
Huntngtn,W.Va.(3) W7 ....5.50
Marion,O.(3) M11 ....4.75
Moline,Ill.(3) R2 ....3.80
Tonawanda (3,4) B12 ....4.75
Williamsport(3) S19 ....5.00
Williamsport(4) S19 ....5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt) U1 ....15.00
Dover,(Eng.Bolt) U1 ....13.50
Dover(Wrgt.Iron) U1 ....12.25
Economy,Pa.(S.R.) B14 ....9.60
Economy,Pa.(D.R.)B14 ....11.90
Economy,(Staybolt)B14 ....12.20
McK.Rks.(Staybolt) L5 ....14.50
McK.Rks.(S.R.) L5 ....9.60
McKRks.(D.R.) L5 ....13.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ....3.70
Alton,Ill.(6) L1 ....3.70
Atlanta A11 ....4.25
Buffalo R2 ....3.70
Cleveland R2 ....3.70
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 ....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 ....3.70
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1 ....3.70
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.30
LosAngeles B3 ....4.40
Milton,Pa. B6 ....4.20
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 ....5.05
N.Tonawanda,N.Y. B11 ....3.70
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 ....3.70
Portland,Oreg. O4 ....4.65
Seattle B3 ....4.45
So.Chicago R2, U5, W14 ....3.70
So.SanFran.,Cal. B3 ....4.45
Struthers,O. Y1 ....3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 ....3.85
Youngstown R2, U5 ....3.70

BARS & SMALL SHAPES, H. R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ....5.55
Bessemer,Ala. T2 ....5.55
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.55
Cleveland R2 ....5.55
Fairfield,Ala. T2 ....5.55
Fontana,Calif. K1 ....6.60
Gary,Ind. U5 ....5.55
Ind.Harbor,Ind. I-2 ....5.55
IndianaHarbor,Ind. Y1 ....6.05
Johnstown,Pa. B2 ....5.55
Lackawanna, N. Y. B2 ....5.55
LosAngeles B3 ....6.25
Pittsburgh J5 ....5.55
Seattle B3 ....6.30
So.Duquesne,Pa. U5 ....5.55
So.SanFrancisco B3 ....6.30
Struthers,O. Y1 ....6.05
Youngstown U5 ....5.55

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....4.55
BeaverFalls,Pa. M12,R2 ....4.55
Buffalo B5 ....4.60
Camden,N.J., P13 ....5.00
Carnegie,Pa. C12 ....4.55
Chicago W18 ....4.55
Cleveland A7, C20 ....4.55
Detroit P17 ....4.70
Donora,Pa. A7 ....4.55
Elyria,O. W8 ....4.55
FranklinPark,Ill. N5 ....4.55
Gary,Ind. R2 ....4.55
GreenBay,Wis. F7 ....4.55
Hammond,Ind. L2, M13 ....4.55
Hartford,Conn. R2 ....5.10
Harvey,Ill. B5 ....4.55
LosAngeles R2 ....6.00
Mansfield,Mass. B5 ....5.10
Massillon,O. R2, R8 ....4.55
Monaca,Pa. S17 ....4.55
Newark,N.J. W18 ....5.00
Plymouth,Mich. P5 ....4.80
Pittsburgh J5 ....4.55
Putnam,Conn. W18 ....5.10
Readville,Mass. C14 ....5.10
St.Louis,Mo. M5 ....4.95
So.Chicago,Ill. W14 ....4.55
SpringCity,Pa.(5) K3 ....5.00
Struthers,O. Y1 ....4.55
Waukegan,Ill. A7 ....4.55
Youngstown F3, Y1 ....4.55

BARS, Cold-Finished Alloy
Ambridge, Pa. W18 ....5.40
BeaverFalls,Pa. M12 ....5.40
Bethlehem,Pa. B2 ....5.40
Buffalo B5 ....5.45
Camden,N.J. P13 ....5.80
Canton,O. R2 ....5.40
Canton,O.(29) T7 ....4.90
Carnegie,Pa. C12 ....5.40
Chicago W18 ....5.40
Cleveland A7 ....5.45
Cleveland C20 ....5.40
Detroit P17 ....5.55
Donora,Pa. A7 ....5.45
Elyria,O. W8 ....5.40
Gary,Ind. R2 ....5.40
Hammond,Ind. L2, M13 ....5.40
Hartford,Conn. R2 ....5.85
Harvey,Ill. B5 ....5.40
Lackawanna,N.Y. B2 ....5.40
Mansfield,Mass. B5 ....5.85
Massillon,O. R2, R8 ....5.40
Midland,Pa. C18 ....5.40
Monaca,Pa. S17 ....5.40
Newark,N.J. W18 ....5.75
Plymouth,Mich. P5 ....5.60
So.Chicago,Ill. R2, W14 ....5.40
Struthers,O. Y1 ....5.40
Warren,O. C17 ....5.40
Waukegan,Ill. A7 ....5.45
Worcester,Mass. A7 ....5.75
Youngstown F3, Y1 ....5.40

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ....4.75
ChicagoHts.(3,4) I-2 ....4.50
Franklin,Pa.(3,4) F5 ....4.75
FortWorth,Tex.(26) T4 ....4.85
Huntngtn,W.Va.(3) W7 ....5.50
Marion,O.(3) M11 ....4.75
Moline,Ill.(3) R2 ....3.80
Tonawanda (3,4) B12 ....4.75
Williamsport(3) S19 ....5.00
Williamsport(4) S19 ....5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt) U1 ....15.00
Dover,(Eng.Bolt) U1 ....13.50
Dover(Wrgt.Iron) U1 ....12.25
Economy,Pa.(S.R.) B14 ....9.60
Economy,Pa.(D.R.)B14 ....11.90
Economy,(Staybolt)B14 ....12.20
McK.Rks.(Staybolt) L5 ....14.50
McK.Rks.(S.R.) L5 ....9.60
McKRks.(D.R.) L5 ....13.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ....3.70
Alton,Ill.(6) L1 ....3.70
Atlanta A11 ....4.25
Buffalo R2 ....3.70
Cleveland R2 ....3.70
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 ....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 ....3.70
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1 ....3.70
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.30
LosAngeles B3 ....4.40
Milton,Pa. B6 ....4.20
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 ....5.05
N.Tonawanda,N.Y. B11 ....3.70
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 ....3.70
Portland,Oreg. O4 ....4.65
Seattle B3 ....4.45
So.Chicago R2, U5, W14 ....3.70
So.SanFran.,Cal. B3 ....4.45
Struthers,O. Y1 ....3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 ....3.85
Youngstown R2, U5 ....3.70

SHEETS, H.R., (19 gage)
AlabamaCity,Ala. R2 ....4.75
Dover,O. R1 ....5.65
Ind.Harbor,Ind. I-2 ....5.40
Mansfield,O. E6 ....5.65
Niles,O. N12 ....5.25
Torrance,Calif. C11 ....5.40

SHEETS, H.R. (14-ga. heavier) High-Strength Low-Alloy
Cleveland J5, R2 ....5.40
Conshohocken,Pa. A3 ....5.65
Ecorse,Mich. G5 ....5.95
Fairfield,Ala. T2 ....5.40
Fontana,Calif. K1 ....6.35
Gary,Ind. U5 ....5.40
Ind.Harbor,Ind. I-2 ....5.40
IndianaHarbor,Ind. Y1 ....5.90
Irvin,Pa. U5 ....5.40
Lackawanna(35) B2 ....5.40
Pittsburgh J5 ....5.40
Sharon,Pa. S3 ....5.40
So.Chicago,Ill. U5 ....5.40
SparrowsPoint(36) B2 ....5.40
Warren,O. R2 ....5.40
Weirton,W.Va. W6 ....5.75
Youngstown U5 ....5.40
Youngstown Y1 ....5.90

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 ....6.55
Ecorse,Mich. G5 ....7.10
Fontana,Calif. K1 ....7.50
Gary,Ind. U5 ....6.55
IndianaHarbor,Ind. Y1 ....7.05
IndianaHarbor,Ind. I-2 ....6.55
Irvin,Pa. U5 ....6.55
Lackawanna(37) B2 ....6.55
Pittsburgh J5 ....6.55
SparrowsPoint(38) B2 ....6.55
Warren,O. R2 ....6.55
Weirton,W.Va. W6 ....6.90
Youngstown Y1 ....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J6, R2	4.35
Ecorse,Mich. G5	4.55
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana, Calif. K1	5.30
Gary,Ind. U5	4.35
GraniteCity,Ill. G4	5.05
Ind.Harbor, Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.55
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
MartinsFerry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10
Torrance,Calif. C11	5.10

BLUED Stock, 29 Ga.

Yorkville,O. W10	6.80
Follansbee,W.Va.(23) F4	6.85

ROOFING SHORT TERNES (8 lb. coated)

Gary,Ind. U5	9.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10	$8.40

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.50
Yorkville,O. W10	9.50

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

SHEETS, Enameling Iron

Ashland,Ky. (8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
GraniteCity,Ill. G4	5.35
Ind.Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

SHEETS, Culvert No. 16

	Cu Alloy	Cu Fe
Ashland A10	5.60	...
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2	5.60	5.85
Gary, U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo C16	6.25	...
MartinsFy.O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	...
SparrowsPt. B2	5.60	...
Torrance,Cal C11	6.35	...

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland(8) A10	3.85
Cleveland R2	4.20
Ind.Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)

	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut lengths)	...	...	7.25	8.50	9.30
Brackenridge,Pa. A4	...	...	7.75	9.00	9.80
GraniteCity,Ill.G4 (cut lengths)	...	...	7.95	9.20	...
Ind.Harbor,Ind. I-2	6.95	7.25	(34)	...	...
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)	...	6.75	7.25	...	...
Vandergrift,Pa. U5	...	7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10	...	7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths ½c lower)

Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35	...	...	...
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35	...	...	...
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGHTS, SILICON (22 Ga.)

	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	...	...	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

TIN PLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa J5	$8.45	$8.70
Fairfield,Ala. T2	8.35	8.80
Gary U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.,Cal. C11	9.20	9.45
Sp.Pt.,Md. B2	8.55	8.80
Warren R2	8.45	8.70
Weirton W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

BLACK PLATE (Base Box)

Aliquippa J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
GraniteCity,Ill. G4	6.45
Ind.Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. R2	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
GraniteCity,Ill. G4	6.05
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

STRIP, Hot-Rolled Alloy

Bridgprt,Conn.(10) S15	5.45
Carnegie,Pa. S18	5.85
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
KansasCity,Mo. S5	6.10
Midland,Pa. C18	5.85
NewBritn.Conn.(10) S15	5.45
Sharon,Pa. S8	5.85
Youngstown U5	5.50

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2	5.30
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G6	5.95
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.30
Ind.Harb.,Ind. I-2	5.30
IndianaHarbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.SanFrancisco(25) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill.(1) L1	3.75
Ashland,Ky.(8) A10	3.50
Atlanta A11	4.00
Bessemer,Ala. T2	3.50
Bridgeprt.Conn.(10) S15	4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	4.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
KansasCity,Mo.(9) S5	4.10
Lackawanna,N.Y.(32) B2	3.50
LosAngeles B3	4.25
Milton,Pa. B6	4.00
Minnequa,Colo. C10	4.55
NewBritain(10) S15	4.00
No.Tonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.SanFrancisco B3	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Cold-Rolled Alloy Steel

Bridgeprt.Conn.(10) S15	10.75
Carnegie,Pa. S18	10.60
Cleveland A7	10.00
Dover,O. G6	10.50
Fontana,Calif. K1	11.65
Harrison,N.J. C18	10.60
Midland,Pa. C18	10.60

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	...	6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1	...	...	7.70	9.65	...
Carnegie,Pa. S18	...	6.50	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65	...	....
Detroit D2	5.60	6.65	7.25	...	....
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C18	...	...	7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn.Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	....
New Castle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35	...	....
NewYork W3	...	7.10	7.70	9.65	11.95
Pawtucket,R.I. N8:					
Cleve.-or-Pitts.Base	...	6.80	7.40	9.35	11.65
Worcester,Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5	...	7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8	...	6.80	7.40	9.35	11.65
Spring Steel (Tempered)					
Trenton,N.J. R5	...	...	10.30	12.50	15.35
Harrison,N.J. C18	...	...	10.30	12.50	15.35
NewYork W3	...	...	10.30	12.50	15.35

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Berea,O. C7	6.60
Bridgprt,Conn.(10) S15	5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	6.30
FranklinPark,Ill.(40) T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.65
NewBritain(10) S15	5.35
NewCastle,Pa. B4	5.35
NewCastle(40) E5	5.25
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I.(21) N8	5.85
Riverdale,Ill.(40) A1	4.90
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O.(40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8 (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown C8	5.25

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bolardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp
G6 Greer Steel Co.

H1 Hanna Furnace Corp.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky. (S) A10	3.75
Warren,O. R2	4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	5.25

TIGHT COOPERAGE HOOP

Atlanta A11	4.05
Riverdale,Ill. A1	3.90
Sharon,Pa. S3	4.15
Youngstown U5	3.75

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
AlabamaCity R2	5.70	5.95
Aliquippa J5	5.70	6.15
Atlanta A11	5.95	6.40
Bartonville(19) K4	5.70	6.15
Buffalo W12	4.85	...
Cleveland A7	5.70	6.15
Crawfordsville M8	5.95	6.40
Donora A7	5.70	6.15
Duluth A7	5.70	6.15
Fairfield T2	5.70	6.15
Houston,Tex. S5	6.10	6.55
Johnstown B2	5.70	6.15
Joliet,Ill. A7	5.70	6.15
KansasCy,Mo. S5	6.30	6.75
Kokomo O16	5.80	6.05
LosAngeles B3	6.65	...
Minnequa C10	5.95	6.45
Monessen P7	5.95	6.40
Palmer W12	5.15	...
Pitts.Calif. C11	6.65	6.80
Prtsmth.(18)P12	6.10	6.60
Rankin A7	5.70	6.15
So.Chicago R2	5.70	5.95
So.S.Fran. C10	6.65	7.10
SparrowsPt. B2	5.80	6.25
Sterling,Ill.(1)N15	5.70	6.15
Struthers,O. Y1	5.70	6.15
Torrance,Cal. C11	6.65	...
Worcester A7	6.00	6.45

WIRE (16 gage)	An'ld Stone	Galv. Stone
Aliquippa J5	10.15	12.15
Bartonville(1) K4	10.25	11.95
Cleveland A7	10.25	12.15
Crawfrdsvle M8	10.30	12.00
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.25	12.15
Kokomo C16	10.25	11.95
Minnequa C10	10.40	12.40
Palmer,Mass.W12	10.25	12.15
Pitts.Cal. C11	10.60	12.50
Prtsmth.(18) P12	10.56	12.30
SparrowsPt. B2	10.35	12.25
Waukegan A7	10.25	12.15

ROPE WIRE	(A)	(B)
Bartonville,Ill. K4	8.55	8.80
Buffalo W12	8.55	8.80
Fostoria, O. S1	8.85	9.10
Johnstown,Pa. B2	8.55	8.80
Monessen,Pa. P16	8.55	8.80
Monessen,Pa. P7	8.80	9.00
Palmer,Mass. W12	8.85	9.10
Portsmouth,O. P12	8.55	8.80
Roebling,N.J. R5	8.85	9.10
SparrowsPt. B2	8.65	8.90
Struthers, O. Y1	8.55	8.80
Worcester J4, T6	8.85	9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	4.85
Aliquippa,Pa. J5	4.85
Atlanta A11	5.10
Alton,Ill.(1) L1	4.85
Bartonville,Ill.(1) K4	4.85
Buffalo W12	4.85
Chicago W13	5.10
Cleveland A7, C20	4.85
Crawfordsville,Ind. M8	5.10
Donora,Pa. A7	4.85
Duluth,Pa. A7	4.85
Fairfield,Ala. T2	4.85
Fostoria,O.(24) S1	5.35
Houston S5	5.25
Johnstown,Pa. B2	4.85
Joliet, Ill. A7	4.85
KansasCity,Mo. S5	5.45
Kokomo,Ind. C16	4.95
LosAngeles B3	5.80
Minnequa,Colo. C10	5.10
Monessen,Pa. P7	5.10
Newark, 6-8ga. I-1	5.50
No. Tonawanda B11	4.85
Palmer,Mass. W12	5.15
Pittsburg,Calif. C11	5.80
Portsmouth,O. P12	5.25
Rankin,Pa. A7	4.85
So.Chicago,Ill. R2	4.85
So.SanFrancisco C10	5.80
SparrowsPoint,Md. B2	4.95
Sterling,Ill.(1) N15	4.85
Struthers,O. Y1	4.85
Torrance,Calif. C11	5.80
Waukegan,Ill. A7	4.85
Worcester,Mass. A7, T6	5.15

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	6.20
Buffalo W12	6.35
Cleveland A7	5.85
Crawfordsville,Ind. M8	6.20
Detroit D2	6.20
Dover,O. G6	6.20
Fostoria,O. S1	6.00
Kokomo,Ind. C16	5.70
Franklin Park,Ill. T6	6.20
Massillon,O. R8	5.85
Monessen,Pa. P16	5.85
Monessen,Pa. P7	6.10
NewHaven,Conn. D2	6.50
Pawtucket,R.I.(12) N8	6.85
Trenton,N.J. R5	6.15
Worcester A7	6.15
Worcester T5	6.50
Worcester W12	6.65

WIRE, Fine & Weaving(8" Coils)

Bartonville,Ill.(1) K4	8.90
Buffalo W12	8.90
Chicago W13	8.90
Cleveland A7	8.90
Crawfordsville,Ind. M8	8.95
Fostoria,O. S1	8.90
Johnstown,Pa. B2	8.90
Kokomo,Ind. C16	8.90
Monessen,Pa. P16	8.90
Palmer,Mass. W12	9.20
Portsmouth,O. P12	8.90
Roebling,N.J. R5	9.20
Waukegan,Ill. A7	8.90
Worcester,Mass. A7, T6	9.20

WIRE, Galv'd ACSR For Cores

Bartonville,Ill. K4	8.50
Monessen,Pa. P16	8.50
Roebling,N.J. R5	8.80
SparrowsPoint,Md. B2	8.60
Johnstown,Pa. B2	8.50

WIRE, Tire Bead

Bartonville,Ill.(1) K4	10.90
Monessen,Pa. P16	11.40
Roebling,N.J. R5	11.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	6.25
Alton,Ill.(1) L1	6.25
Bartonville,Ill.(1) K4	6.25
Buffalo W12	6.25
Cleveland A7	6.25
Donora,Pa. A7	6.25
Duluth A7	6.25
Fostoria,O. S1	6.25
Johnstown,Pa. B2	6.25
LosAngeles B3	7.20
Milbury,Mass.(12) N6	8.05
Monessen,Pa. P7, P16	6.25
Palmer,Mass. W12	6.55
Pittsburg,Calif. C11	7.20
Roebling,N.J. R5	6.55
Portsmouth,O. P12	6.25
So.Chicago,Ill. R2	6.20
So.SanFrancisco C10	7.20
SparrowsPoint,Md. B2	6.35
Struthers,O. Y1	6.25
Trenton,N.J. A7	6.55
Waukegan,Ill. A7	6.25
Worcester A7, T6, W12	6.55
Worcester,Mass. J4	6.75

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.90
Alton,Ill.(1) L1	5.90
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth A7	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Monessen,Pa. P7, P16	5.90
NewHaven,Conn. A7	6.20
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
SoSanFrancisco C10	6.85
SparrowsPoint,Md. B2	6.00
Torrance,Calif. C11	6.85
Trenton,N.J. A7	6.20
Waukegan,Ill. A7	5.90
Worcester,Mass. A7	6.20

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala. R2	126
Ala.City,Ala.,17-18ga.R2	213
Aliquippa,Pa.9-14½ga.J5	130
Atlanta A11	133
Bartonville,Ill.(19) K4	130
Crawfordsville,Ind. M8	132
Donora,Pa. A7	130
Duluth A7	130
Fairfield,Ala. T2	130
Houston,Tex. S5	138
Johnstown,Pa. B2	130
Johnstown,17ga.,6" B2	204
Johnstown,17ga.,4" B2	207
Joliet,Ill. A7	130
KansasCity,Mo. S5	142
Kokomo,Ind. C16	132
Minnequa,Colo. C10	138
Monessen,Pa. P7	135
Pitsburg,Calif. C11	153
Portsmouth,O.(18) P12	137
Rankin,Pa. A7	130
So.Chicago,Ill. R2	126
Sterling,Ill.(1) N15	130

FENCE POSTS

Chicagolits.,Ill. C2	140
Duluth A7	125
Franklin,Pa. F5	140
Huntington,W.Va. W7	140
Johnstown,Pa. B2	140
Marion,O. P11	140
Minnequa,Colo. C10	130
Moline,Ill. R2	136
So.Chicago R2	14w
Tonawanda B12	140
Williamsport,Pa. S19	150

WIRE, Barbed	Col.
AlabamaCity, Ala. R2	136
Aliquippa,Pa. J5	140
Atlanta A11	143
Bartonville,Ill.(19) K4	143
Crawfordsville M8	145
Donora,Pa. A7	142
Duluth,Minn. A7	140
Fairfield,Ala. T2	140
Houston,Tex. S5	148
Johnstown,Pa. B2	140
Joliet,Ill. A7	140
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142
Minnequa,Colo. C10	146
Monessen,Pa. P7	145
Pittsburg,Calif. C11	160
Portsmouth,O.(18) P12	147
Rankin,Pa. A7	140
So.Chicago,Ill. R2	136
So.SanFran.,Calif. C10	160
SparrowsPoint,Md. B2	142
Sterling,Ill.(1) N15	140

BALE TIES, Single Loop Col.

AlabamaCity,Ala. R2	123
Atlanta A11	126
Bartonville,Ill.(19) K4	123
Crawfordsville M8	132
Donora,Pa. A7	123
Duluth A7	123
Fairfield,Ala T2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	128
Pittsburg,Calif. C11	147
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	147
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	6.10
Bartonville,Ill. (19) K4	5.95
Crawfordsville,Ind. M8	6.30
Donora,Pa. A7	5.95
Duluth A7	5.95
Johnstown,Pa. B2	5.95
Joliet,Ill. A7	5.95
Kokomo,Ind. C16	6.05
Minnequa,Colo. C10	6.20
Pittsburg,Calif. C11	6.90
Portsmouth,O. P12	6.25
Rankin,Pa. A7	5.95
So.Chicago,Ill. R2	6.10
SparrowsPoint,Md. B2	6.05
Sterling,Ill.(1) N15	5.65
Worcester,Mass. A7	6.25

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken,Pa. A3	$7.35
Wheeling,W.Va. W10	7.15

NAILS & STAPLES, Stock To dealers & mfrs. (7)

	Col.
AlabamaCity,Ala. R2	118
Aliquippa,Pa. (13) J5	118
Atlanta A11	121
Bartonville,Ill.(19) K4	118
Chicago,Ill. W13	118
Cleveland A9	123
Crawfordsville,Ind. M8	122
Donora,Pa. A7	118
Duluth A7	118
Fairfield,Ala. T2	118
Galveston,Tex. D7	126
Houston,Tex. S5	126
Johnstown,Pa. B2	118
Joliet,Ill. A7	118
KansasCity,Mo. S5	130
Kokomo,Ind. C16	120
Minnequa,Colo. C10	123
Monessen,Pa. P7	124
Pittsburg,Calif. C11	137
Portsmouth,O. P12	124
Rankin,Pa. A7	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2	120
Sterling,Ill.(1) N15	118
Torrance,Calif. C11	138
Worcester, Mass. A7	124

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	6.40
Lebanon,Pa. B2	6.15
Minnequa,Colo. C10	6.15
Pittsburgh J5	6.15
Seattle B3	6.65
So.Chicago,Ill. R2	6.15
Struthers,O. Y1	6.15
Youngstown R2	6.15

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.85
Lebanon,Pa.(32), B2	9.85
Minnequa,Colo. C10	9.85
Pittsburgh O2, P14	9.85
Seattle B3	10.35

TIE PLATES

Fairfield,Ala. T2	4.50
Gary,Ind. U5	4.50
Ind.Harbor,Ind. I-2	4.50
Lackawanna,N.Y. B2	4.50
Minnequa,Colo. C10	4.50
Pittsburgh,Calif. C11	4.65
Seattle B3	4.65
Steelton,Pa. B2	4.50
Torrance,Calif. C11	4.65

JOINT BARS

Bessemer,Pa. U5	4.70
Fairfield,Ala. T2	4.70
Ind.Harbor,Ind. I-2	4.70
Joliet,Ill. U5	4.70
Lackawanna,N.Y. B2	4.70
Minnequa,Colo. C10	4.70
Steelton,Pa. B2	4.70

AXLES

Ind.Harbor,Ind. S18	5.60
Johnstown,Pa. B2	5.60

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	3.60	3.50	3.55	4.00
Ensley,Ala. T2	3.60	3.50	...	4.00
Fairfield,Ala. T2	...	...	...	4.00
Gary,Ind. U5	3.60	3.50	3.55	...
Huntington,W.Va. W7	...	...	...	5.00
Ind.Harbor,Ind. I-2	3.60	3.50	3.55	...
Johnstown,Pa. B2	...	...	...	(16)4.00
Lackawanna B2	3.60	3.50	...	4.00
Minnequa,Colo. C10	3.60	3.50	...	4.50
Steelton,Pa. B2	3.60	3.50	...	...
Williampsort,Pa. S19	...	...	...	4.75

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	23.00	13.5W,4Cr,3V	140.00
Extra Carbon	27.00	18W,4Cr,2V,9Co	217.50
Spec. Carbon	32.50	19W,4Cr,2V,7Co	217.50
Oil Hardening	35.00	18.25W,4.25Cr,IV,4.75Co	185.50
Cr. Hot Wrk	35.00	20.25W,4.25Cr,1.6V,12.25Co	323.00
Hi-Carbon-Cr	63.50	1.5W,4Cr,1V,8.5Mo	78.50
18W,4Cr,IV	123.50	6.4W,4.5Cr,1.9V,5Mo	87.00
18W,4Cr,2V	138.00	6W,4Cr,3V,6Mo	109.50

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2, V3.

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cnts. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pittsburgh base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Plate only.
(18) To dealers.
(19) Chicago & Pittsburgh base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. base.
(22) Del. San Fran. Bay area.
(23) 28 Ga. 36" wide.
(24) Deduct 0.20c finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.60c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. edge or square edge.
(33) To jobbers, deduct 30 cents.
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield, S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.

U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 YoungstownSheet&Tube

Check on its
Uniformity –
Economy –
Toughness –
20th Century
the persuasive abrasive
One of the world's largest producers of quality shot and grit—*Normalized—Cut-wire—Hard Iron
*Licensed under U.S. Patent No. 2184926
THE CLEVELAND Metal Abrasive CO.
884 East 67th Street Cleveland 8, Ohio
Howell Works: Howell, Michigan

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	34.0	32.0	29.0	1.5	+0.5	+3.5
¼	8.0	0.42	38.5	36.5	33.5	+1.0	+3.0	+6.0
⅜	8.0	0.57	38.5	36.5	33.5	+7.0	+9.0	+12.0
½	8.5	0.85	36.0	34.0	31.0	14.0	12.0	13.0
¾	11.5	1.18	39.0	37.0	38.0	18.0	16.0	17.0
1	17.0	1.68	41.5	39.5	40.5	21.5	19.5	20.5
1¼	23.0	2.28	42.0	44.0	41.0	22.0	24.0	21.0
1½	27.5	2.78	42.5	41.5	41.5	23.0	21.5	22.0
2	37	3.68	43.0	41.0	42.0	23.5	21.5	22.5
2½	58.5	5.82	43.5	41.5	42.5	24.0	22.0	23.0
3	76.5	7.62	43.5	41.5	42.5	24.0	22.0	23.0

Column A: Etna, Pa. N2; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 3½ points lower on ¼", 1½ points lower on ⅜", and 2 points lower on ½", W10; Sharon, Pa. M6, 1 point higher on ¼", 2 points lower on ¾" and ⅜". Following make ½" and larger: Lorain, O., N3; Youngstown R2 and 36¼% on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11½ points lower on ¼" and larger continuous weld and 24% on 3½" and 4". Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y1; Alton, Ill. (Gary base) L1.

Column D: Butler, Pa. F6, ⅛-⅜"; Benwood, W. Va. W10, except plus 3½% on ⅜", plus 2½% on ¼", plus 9% on ⅛"; Sharon, Pa. M6, plus 0.5 on ⅛", 1 point lower on ½", ¾"..1½ points lower on 1" and 1¼", 2 points lower on 1½", 2" 2½" and 3". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 16½% on 3½" and 4"; Youngstown Y1. Aliquippa, Pa. J5 quotes 1 point lower on ⅜", 2 points lower on 1", 1½ points lower on 1¼", 2 points lower on 1½" and 2", 1½ points lower on 2½" and 3"; Etna, Pa. N2 and 18½% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	29.5	9.5	29.5	9.5
2½	58.5	5.82	32.5	12.5	32.5	12.5
3	76.5	7.62	32.5	12.5	32.5	12.5
3½	92.0	9.20	34.5	14.5	34.5	14.5
4	$1.09	10.89	34.5	14.5	34.5	14.5
5	1.48	14.81	37.0	17.0	37.0	17.0
6	1.92	19.18	37.0	17.0	37.0	17.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6 in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1¾	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2¼	12	26.92	32.97	26.98	31.76
2½	12	29.65	36.32	29.57	34.76
2¾	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates— Carbon Base 10%	Plates— Carbon Base 20%	Strip—Cold-Rolled Carbon Base Both Sides 10%	Strip—Cold-Rolled Carbon Base Both Sides	Sheets— Carbon Base 10%	Sheets— Carbon Base 20%	Cu Base Both Sides
302	....	....	....	....	19.75	27.50	77.00
304	25.00	28.00	....	....	20.75- 24.50	27.50	77.00
309	30.50	35.00	....	....	....	....	....
310	36.50	41.00	....	....	....	....	144.00
316	29.50	31.50- 34.00	....	....	26.00	34.50	....
317	34.50	39.00	....	....	....	....	....
318	38.50	38.00	....	....	....	....	....
321	26.50	31.00	....	....	23.00	33.00	111.00
347	27.50	30.50- 32.00	....	....	24.00	33.50	130.00
405	21.25	27.75	....	....	....	....	....
410	20.75	27.25	....	....	....	....	165.00
Nickel	33.25	44.25	41.00	54.00	....	....	....
Inconel	41.00	53.50	....	....	....	....	....
Monel	34.75	45.75	....	....	....	....	....
Copper*	....	....	23.70†	29.65†	....	....	....

* Deoxidized. † 20.20c for hot-rolled. ‡ 24.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. 1-4; stainless-clad plates, Claymont, Del. W16, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, monel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:

½-in. & smaller diam.	15
⅝-in. & ⅞-in.	18.5
1-in. and larger	17.5

Longer than 6 in.:

All diams.	14

Lag bolts, all diams.:

6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap, and Sleigh Shoe	21
Tire bolts	12
Boiler & Fitting-Cp bolts	31

NUTS

	Reg.	Heavy
H.P. & C.P.		
Square:		
½-in. & smaller	15	15
⅝-in. & ⅞-in.	12	6.5
1-in.-1½-in.	9	1
1⅝-in. & larger	7.5	1
H.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ⅞-in.	16.5	6.5
1-in.-1½-in.	12	2
1⅝-in. & larger	8.5	2
C.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ⅞-in.	23	17.5
1-in. & 1⅛-in.	19.5	12
1⅛-in. & larger	12	6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or key quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
⅝-in. & ⅞-in.	29.5	22
1-in.-1½-in.	24	15
1⅛-in. & larger	13	8.5
	Light	
½-in. & smaller	35	
⅝-in. to ⅞-in.	28.5	
1-in. to 1½-in.	26	

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	48 & 10
Plated finishes	31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:

¼-in. & smaller	42
⅜-in. through 1 in.	34

Longer than 6 in.:

⅝-in. & smaller	26
¾-in. through 1 in.	4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	35
¼-in. diam. & larger	16
N.F. thread, all diams.	10

RIVETS

F.o.b. midwestern plants

Structural ½-in., larger 7.85c

⅞-in. under ..... 36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..List to list-plus-50c.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb
17,18,20	60-72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95
4-5½	40	21.50
3	40	22.61
2½	24-30	23.15
2	24-30	25.36

CARBON

40	100,110	8.03
35	100,150	8.03
30	84,110	8.03
24	72 to 104	8.03
17 to 20	34-90	8.03
14	60-72	8.57
10,12	60	8.84

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	41.00	34.00	31.25
302	41.00	36.50	33.25
303	43.00	40.00	33.75
304	43.00	38.50	32.75
309	55.50	54.50	44.25
316	56.50	58.50	48.75
321	49.00	48.00	36.75
347	53.50	52.00	41.25
410	36.50	30.50	25.75
416	37.00	37.00	26.25
420	44.00	47.00	31.25
430	39.00	31.00	26.25
501	27.50	26.00	14.25
502	28.50	27.00	15.25

Baltimore. Types 501 through 347 sheet, except 309 E2.

Brackenridge, Pa., sheets A4*.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502, S18.

Cleveland, strip A7.

Detroit, strip, except Types 309, 321, 416, 420, 501 and 502 M1.

Dunkirk, N. Y., bars, wire A4*.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip C18.

McKeesport, Pa., bars, sheets except Type 416 U5.

McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Pittsburgh, sheets C18.

Reading, Pa., bars and strip, except 55.50c for Type 308 strip and 44.75c for Type 309 bars, C4.

Sharon, Pa., strip, except Types 303, 309, 316, 416, 501 and 502 S3.

So. Chicago, Ill., bars & structurals U5†.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars, U4.

Wallingford, Conn., strip, except 309, W2 quotes 0.25 cents higher.

Washington, Pa., bars, sheets & strip, except Type 309 sheets 56.60c and bars 44.75c, J3.

Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309, 316 sheets 61.50c, strip 63.00c, W4.

Watervliet, N. Y., structurals & bars A4*.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4.

Youngstown, strip, except Types 303, 309, 316, 416, 501 and 502 C8.

* Higher prices quoted June 26.

† Higher prices quoted July 2.

COAL CHEMICALS

Spot, cents per gallon, ovens	
Pure benzol	30.00-35.00
Toluol, one deg.	26.00-33.00
Industrial xylol	25.00-33.50
Per ton bulk, ovens	
Sulphate of ammonia	$32-$45
Cents per pound, ovens	
Phenol, 40 (carlots, non-returnable drums)	17.25
Do., less than carlots	18.00
Do., tank cars	15.50

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF2 content, 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

	Cents
Sponge iron	
98+% Fe, carlots	16.00
Swedish, c.i.f. New York, in bags	7.40-8.50
Electrolytic Iron:	
Annealed, 99.5% Fe	42.50
Unannealed, 99 + % Fe	36.50
Unannealed, 99 + % Fe (minus 325 mesh)	58.50
Powder Flakes	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns	83.00-148.00
Aluminum:	
Carlots, freight allowed	29.50
Atomized, 500 lb drums, freight allowed	37.50
Brass, 10-ton lots	30.00-33.25
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 10 tons	50.00
Copper:	
Electrolytic	42.25
Reduced	33.75-34.00
Lead	25.50
Magnesium	75.00-85.00
Manganese:	
Minus 100-mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	83.00
Nickel-Silver, 10-ton lots	44.00
Silicon	38.50
Solder (plus cost of metal)	8.50
Stainless Steel, 302	83.00
Zinc, 10-ton lots	23.00-30.50
Tungsten:	Dollars
99%, minus 80 to 200 mesh, freight allowed:	
1000 lb and over	4.00
Less than 1000 lb	4.15
98.8% minus 65 mesh, freight allowed:	
1000 lb. and over	4.15
less than 1000 lb.	4.25
Molybdenum:	
99% minus 80 to 200 mesh, over 500 lb	2.85
200 to 500 lb	3.10
less than 200 lb	3.25
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvll.fur.	$14.50-15.00
Connellsvll.fdry.	17.00-18.00
New River, foundry	21.30
Wise county, foundry	15.95
Wise county, furnace	15.20

OVEN FOUNDRY COKE

Kearney, N. J., ovens	$22.75
Everett, Mass., ovens	
New England, del.	*24.80
Chicago ovens	23.00
Chicago, del.	24.40
Terre Haute, ovens	22.50
Milwaukee, ovens	23.75
Indianapolis, ovens	22.75
Chicago, del.	26.28
Cincinnati, del.	25.73
Detroit, del.	26.71
Ironton, O., ovens	22.50
Cincinnati, del.	25.12
Painesville, O., ovens	24.00
Cleveland, del.	25.75
Erie, Pa., ovens	23.50
Birmingham, ovens	20.30
Birmingham, del.	21.60
Philadelphia, ovens	22.70
Neville Island, Pa., ovens	23.00
Swedeland, Pa., ovens	22.60
St. Louis, ovens	
St. Louis, del.	25.40
Portsmouth, O., oven	22.50
Cincinnati, del.	25.12
Detroit, ovens	24.00
Detroit, del.	25.00
Buffalo, del.	26.75
Flint, del.	26.40
Pontiac, del.	25.42
Saginaw, del.	26.81

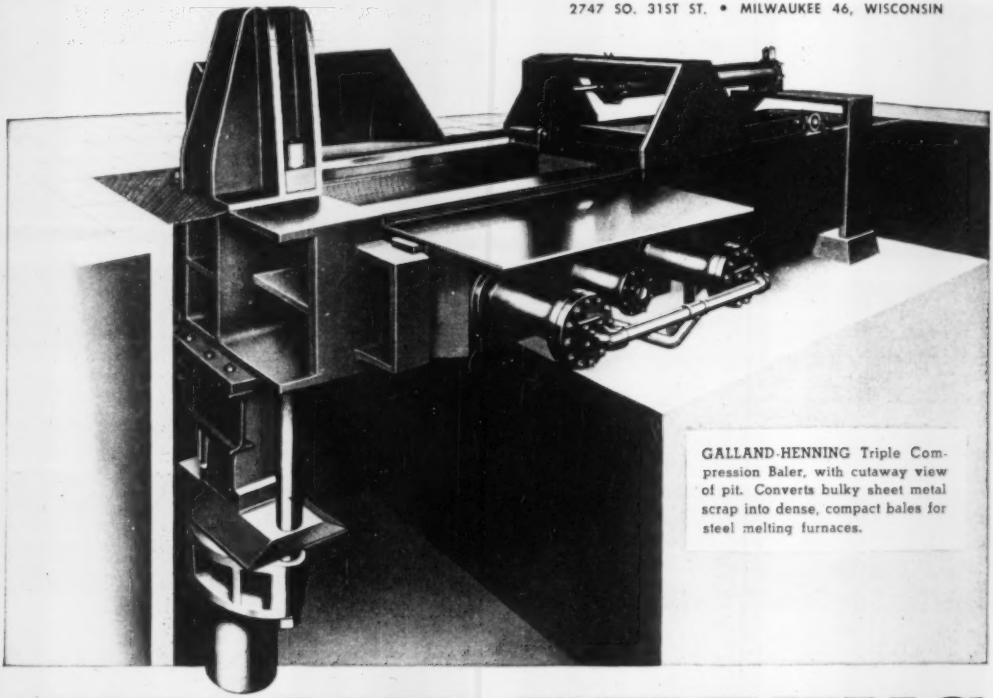
* Or within $4.15 freight zone from works.

. . . and Baled Sheet Metal Scrap Helps Keep Steel Production at a High Level

If you are not baling your sheet metal scrap, perhaps you should be . . . not only for the immediate benefit to your own operation . . . but in the interest of a strong industrial economy. More and more steel is needed for its continued strength and growth.

If you question the advisability of baling your sheet metal scrap, competent counsel is available without cost or obligation. Galland-Henning engineers offer you the benefit of many years' experience in all types of scrap metal baling . . . and in the design, construction and installation of powerful, efficient baling equipment which assures lowest possible cost-per-ton.

GALLAND-HENNING MFG. CO.
2747 SO. 31ST ST. • MILWAUKEE 46, WISCONSIN



GALLAND-HENNING Triple Compression Baler, with cutaway view of pit. Converts bulky sheet metal scrap into dense, compact bales for steel melting furnaces.

GALLAND-HENNING
SCRAP METAL BALING PRESSES

A 5840-1P

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140‡		Carbon	Floor
New York (city)	6.27	7.29	8.44	6.59	...	6.42	7.28	9.25	6.40	6.58	8.08
New York (c'try)	5.97	6.99	8.14	6.29	...	6.12	6.99	8.95	6.10	6.28	7.74
Boston (city)	6.40	7.20	8.49	6.35	...	6.25	7.04	9.25	6.40	6.98	7.88
Boston (c'try)	6.20	7.00	8.29	6.15	...	6.05	6.84	9.05	6.20	6.78	7.68
Phila. (city)	6.15	7.05	8.25	6.35	...	6.30	7.11	8.90	6.15	6.30	7.40
Phila. (c'try)	5.90	6.80	8.00	6.10	...	6.05	6.86	8.65	5.90	6.05	7.15
Balt. (city)	5.80	7.04	8.27	6.24	...	6.24	7.09	...	6.34	6.00	7.64
Balt. (c'try)	5.60	6.84	8.07	6.04	...	6.04	6.89	...	6.14	5.80	7.44
Norfolk, Va.	6.50	...	...	6.70	...	6.55	7.70	...	6.60	6.50	8.00
Richmond, Va.	5.90	...	8.10	6.10	...	6.10	6.90	...	6.30	6.05	7.80
Wash. (w'hse)	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.56	6.22	7.86
Buffalo (del.)	5.80	6.60	8.29	6.06	...	5.80	6.65	10.65††	6.00	6.25	7.55
Buffalo (w'hse)	5.60	6.40	8.08	5.86	...	5.60	6.45	10.45††	5.80	6.05	7.35
Pitts. (w'hse)	5.60	6.40*	7.75	5.85-5.95	6.90	5.56	6.40	10.10††	5.70	5.75	7.00
Detroit (w'hse)	5.45-5.78	6.53-6.80	7.99	5.94-5.95	7.75	5.84	6.56	8.91	6.09	6.19-6.35	7.28
Cleveland (del.)	5.80	6.60	8.30	5.89	7.10	5.77	6.60-6.70	8.91	10.02	6.12	7.32
Cleve. (w'hse)	5.60	6.40	8.10	5.69	6.90	5.57	6.40-6.50	8.71	5.82	5.92	7.12
Cincin. (city)	6.02	6.59	7.34	5.95	...	5.95	6.51	...	6.24	6.34	7.50
Chicago (city)	5.80	6.60	7.96	5.75	...	5.75	6.50	10.30	5.90	6.00	7.20
Chicago (w'hse)	5.60	6.40	7.75	5.55	...	5.55	6.30	10.10	5.70	5.80	7.00
Milwaukee (city)	5.94	6.74	8.09	5.89	...	5.89	6.74	10.44	6.04	6.14	7.34
Milwau. (c'try)	5.74	6.54	7.89	5.69	...	5.69	6.54	10.24	5.84	5.94	7.14
St. Louis (del.)	6.05	6.85	8.20	6.00	...	6.00	6.85	10.55	6.23	6.33	7.53
St. L. (w'hse)	5.85	6.65	8.00	5.80	...	5.80	6.65	10.35	6.03	6.13	7.33
Kans. City (city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
KansCity (w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city)	5.75	6.55	6.90§	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm (w'hse)	5.60	6.40	6.75§	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.55	8.10	9.05§	6.60	8.90	6.55	7.75	...	6.55	6.60	9.20
L. A. (w'hse)	6.35	7.90	8.85§	6.40	8.70	6.35	7.55	...	6.35	6.40	8.70
San Francisco	6.65	7.50§	8.90§	6.60	...	6.45	8.20	...	6.45	6.50	8.60
Seattle-Tacoma	7.05	8.60§	9.20§	7.30	...	6.75	9.10	11.15	6.65	6.75	8.80

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded; ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; §—500 to 1499 lb; §—450 to 1499 lb; ‡—3500 lb and over; §—1000 to 1999 lb.

ORES

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports. After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit, del. E. Pa.

Foundry and basis 56-62% concentrates contract	17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	15.75
Brazilian iron ore, 68-69%	18.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite, mines	65.00

Manganese Ore

Indian manganese, 46-48%, nearby, 92.00-96.00c per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79.8-81.8c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00

South African Transvaal

44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00

Domestic—rail nearest seller

48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb. molybdenum content, mines	$1.00

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 21.75c per lb of contained Cr, c.l., packed 22.65c, ton lot 23.80c, less ton 25.20c. Delivered, Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%.) Contract, carload, lump, bulk, max. 0.03% C 33.60c per lb of contained Cr, 0.04% C 31.50c, 0.06% C 30.50c, 0.10% C 30.00c, 0.15% C 29.75c, 0.20% C 29.50c, 0.50% C 29.25c, 1% C 29.00c, 1.50% C 28.85c, 2% C 28.75c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered, Spot, add 0.25c.

Foundry Ferrochrome, High Carbon: (Cr 62-66%, C 3-7%.) Contract, c.l. S M x D, bulk, 23.25c per lb of contained Cr, C.l., packed 24.15c, ton 25.50c, less ton 27.25c. Delivered Spot, add 0.25c.

Foundry Ferrochrome, Low Carbon: (Cr 50-54%, Si 2-8-32%, C 1.25% max.) Contract, carload, packed, S M x D, 16.35c per lb of alloy; ton lot 17.2c; less ton lot, 18.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 21.75c per lb of contained chromium plus 12.4c per pound of contained silicon; 1" x down, bulk 21.90c per pound of contained chromium plus 12.60c per pound of contained silicon, F.o.b. plant; freight allowed to destination.

Ferrochrome Silicon, No. 2: (Cr 36-39%, Si 36-39%, Al 7-9%, C 0.05% max.) 21.75c per lb of contained silicon plus 12.4c per lb of contained silicon plus aluminum, 3" x down, delivered.

Chromium Metal: (Min. 97% Cr and 1% Fe) Contract carload, 1" x D; packed, max 0.50% C grade, $1.08 per lb of contained chromium ton lot $1.10, less ton $1.12. Delivered. Spot add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.00c per lb of contained Si; packed 21.40c; ton lot 22.30c, f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.40c per lb of contained Si, carload packed 14.0c, ton lot 15.45c, less ton 17.1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.3c per lb of contained Si, carload packed 15.6c, ton lot 16.75c, less ton 18.0c. Delivered. Spot, add 0.8c.

Note: Current prices on zirconium, calcium and briquetted alloys appeared on page 157, June 18 issue; manganese, titanium and "other" ferroalloys, page 139, July 2. Refractories prices were published on page 151, June 11.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.) Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.5c per lb of contained Si, carload packed 18.7c, ton lot 19.65c, less ton 20.7c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l. lump, bulk, regular 20.0c per lb of Si, c.l packed 21.2c, ton lot 22.1c, less ton 23.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe.) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.90c per lb of alloy, ton lots packed 11.30c, 200 to 1999 lb 11.65c, smaller lots 12.15c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max., C 3-3.5% max.). Contract, any quantity, $3.10 per lb of contained V. Delivered, Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3.20. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max., C 0.20% max.) $3.30.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (18% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

TUNGSTEN ALLOYS*

Ferrotungsten: (70-80%), 10,000 lb W or more, $5.00 per lb of contained W 2000 lb W to 10,000 lb W, $5.10; less than 2000 lb W, $5.22.

Tungsten Powder: Carbon Reduced; (W 98.8% min.) 1000 lb or more, $6.00 per lb of contained W; less than 1000 lb W, $6.15.

**Government ceiling prices, effective May 7, 1951, f.o.b. Niagara Falls, N. Y., basis.*

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Apr. 19, 1951

STEELMAKING SCRAP COMPOSITE

July 5	$44.00
June 28	44.00
June 1951	44.00
July 1950	37.01
July 1946	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

No. 1 Heavy Melting Steel (Grade) 1

Basing Point	Dealer, Industrial	Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Point, Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades

2. No. 2 Heavy Melting	—$2.00
3. No. 1 Busheling	Base
4. No. 1 Bundles	Base
5. No. 2 Bundles	3.00
6. Machine Shop Turnings	—10.00
7. Mixed Borings & Short Turnings	— 6.00
8. Shoveling Turnings	— 6.00
9. No. 2 Busheling	— 4.00
10. Cast Iron Borings	— 6.00

Elec. Furnace and Frdy. Grades

11. Billet, Bloom & Forge Crops	+ 7.50
12. Bar Crops & Plate	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate:	
16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. Briquetted Cast Iron Borings	Base
Foundry, Steel:	
20. 2 feet and under	+ 2.00
21. 1 foot and under	+ 4.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free Turnings	— 3.00
24. Heavy Turnings	— 1.00

Special Grades

25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	— 3.00
27. No. 2 Chemical Borings	— 4.00
28. Wrought Iron	+ 10.00
29. Shafting	+ 10.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively.

(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.

(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.

(4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and open-hearth furnaces of foundries.

(5) Prices for Grade 29 may be charged only when sold for forging or refolling purpose.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.

(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings of scrap recovered from slag dumps and prepared-to-charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12.

(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 heavy melting steel less $15.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap:

2. No. 2 Heavy Melting Steel	—$2.00
3. No. 2 Steel Wheels	Base
4. Hollow Bored Axles and loco. axles with keyways between the wheelseats	Base
5. No. 1 Busheling	— 3.00
6. No. 1 Turnings	— 3.00
7. No. 2 Turnings, Drillings & Borings	—12.00
8. No. 2 Cast Steel and uncut wheelcenters	— 6.00
9. Uncut Frogs, switches	Base
10. Flues, Tubes & Pipes	— 8.00
11. Structural, Wrought Iron and/or steel, uncut	— 6.00
12. Destroyed Steel Cars	— 8.00
13. No. 1 Sheet Scrap	— 9.50
14. Scrap Rails, Random Lengths	+ 2.00
15. Refolling Rails	+ 7.00
Cut Rails:	
16. 3 feet and under	+ 5.00
17. 2 feet and under	+ 6.00
18. 18 inches and under	+ 8.00
19. Cast Steel, No. 1	+ 5.00
20. Uncut Tires	+ 2.00
21. Cut Tires	+ 5.00
Bolsters & Side Frames:	
22. Uncut	Base
23. Cut	+ 3.00
24. Angle, Splice Bars & Tie Plates	+ 5.00
25. Solid Steel Axles	+12.00
26. Steel Wheels, No. 3 oversize	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	+ 5.00
29. Couplers & Knuckles	+ 5.00
30. Wrought Iron	+ 8.00
31. Fireboxes	+ 8.00
32. Boilers	+ 6.00
33. No. 2 Sheet Scrap	—13.00
34. Carsides, Doors, Car Ends, cut apart	— 6.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses; otherwise, ceiling shall not exceed that for Grade 14.

(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise, ceiling shall not exceed that for No. 1 heavy melting steel.

(3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise, ceiling shall not exceed that for base grade (No. 1).

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:

1. No. 1 (Cupola)	$49.00
2. No. 2 (Charging Box)	47.00
3. No. 3 (Hvy. Breakable)	45.00
4. No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	55.00
11. Drop Broken Machinery	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 3 cast iron.

(2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 10 shall be ceiling price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 1, No. 2 or No. 3, $8.

(2) For hydraulically compressing Grade No. 4, $6 per ton; Grade No. 5, $8.

(3) For crushing Grade No. 6, $3.

(4) For preparing into Grade No. 25, $6.

(5) For preparing into Grade No. 19, $6.

(6) For preparing into Grades No. 12, No. 13, No. 14, No. 16, or No. 29, $10.

(7) For preparing into Grade No. 17 or Grade No. 21, $11.

(8) For preparing into Grade No. 18 or Grade No. 20, $12.

(9) For hydraulically compressing Grade No. 15, $8.

(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intrasit preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.

(2) For hydraulically compressing Grade No. 13, $6.

(3) For preparing into Grade No. 16, $4.

(4) For preparing into Grade No. 17, $5.

(5) For preparing into Grade No. 20, $7.

(6) For preparing into Grade No. 21, $4.

(7) For preparing into Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:

(1) For preparing Grade No. 8 into grade No. 7, $9.

(2) For preparing Grade No. 3 into Grade No. 11, $7.

(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commissions shall be payable to a broker in excess of $1.

Unprepared Scrap

For unprepared scrap, other than materials suitable for hydraulic compression, ceiling basing point prices shall be $8 per ton beneath ceiling for No. 1 bundles; or when compressed constitutes No. 2 bundles ceiling basing point price shall be $8 beneath ceiling basing point price for No. 2 bundles.

Premiums for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:

Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 51c.

Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 53c; Butler, Pa., 65c.

Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 65c; Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c.

Coatesville, Pa., 50c; Conshohocken, Pa., 20c.

Detroit, 95c; Duluth, Minn., 50c.

Harrisburg, Pa., 51c; Houston, Tex., 57c.

Johnstown, Pa., 75c.

Kansas City, Mo., 78c; Kokomo, Ind., 51c.

Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c.

Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c.

St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sparrows Point, Md., 20c; Steubenville, O., 51c.

Warren, Pa., 75c; Weirton, W. Va., 70c.

Youngstown, 75c.

HAMILTON, ONT.
(Delivered Prices)

Heavy Melt.	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	34.00
Mechanical Bundles	33.00
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	28.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Busheling	29.50
Bushlings new factory, prep'd	33.00
Bushelings new factory, unprep'd	28.00
Short Steel Turnings	28.00
Cast Iron Grades*	
No. 1 Machinery Cast	58.00-60.00

* F.o.b. shipping point.

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LURIA BROTHERS AND COMPANY, INC.

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The Metal Market

Price tone of nonferrous metal markets remains firm despite uncertainty expressed in financial quarters due to peace negotiations. Copper shortage to continue through year

KOREAN peace negotiations are causing nervousness among traders in base metal issues on the country's leading stock exchanges since they are uncertain about the trend of metal prices should the peace efforts prove successful. This tension did not spread, however, to the actual metal markets.

While cessation of fighting undoubtedly would necessitate readjustments in the national economy, brakes would not be applied promptly on the defense efforts and a large portion of war materiel contracts would be carried through to completion. Consumption of metals will remain heavy through 1951. In addition, potential demand to replenish working stocks of metals at smelteries, refineries, fabricating plants will remain substantial regardless of the outcome of the peace talks.

Eric Johnston, economic stabilizer, told the Senate Finance Committee last week that despite attempts to boost copper production the country still will be short some 100,000 to 150,000 tons of its needs this year. The present situation in which Chilean producers get 27.50c a pound for copper and United States producers get only 24.50c is unsatisfactory.

"We are going to have to do one or the other soon," Mr. Johnston said, indicating the alternatives are either a boost in the United States price to 27.50c or a 3-cent subsidy to users of the imported metal. For the time being, he defended the higher price for Chilean copper on grounds that some buyers in the world market are paying 45.00c to 50.00c a pound for the metal.

Tin Controls Tightened

Reconstruction Finance Corp. maintained its selling price for Grade A tin at $1.06 through July 5. The government is expected to re-enter the world market for supplies soon, since the price has declined close to the level which is required for such action.

NPA has revised regulations governing the use of pig tin for the third quarter in order to make additional savings in the use of the metal and to give added incentives for more efficient utilization of tin scrap.

Conservation order M-8 now limits all users of pig tin to a rate of 90 per cent of the amount used during the first six months of 1950 and eliminates the "ex-quota" required by them to produce implements of war. The amount of tin any person can use without an allocation has been reduced to 6000 pounds from five long tons. The amount of inventory of lead base alloys that may be kept on hand has been reduced from 60 to 45 days.

Manufacturers of milk cans and tin plate are now programmed and may consume only that pig tin specifically authorized by NPA, so they have been removed from the 90 per cent quota limitation.

For the first time, specifications have been established for wrought bronze alloys. This was done to reduce the amount of tin used in these alloys.

Solder used on electrical precision instruments, recording and indicating meters, dairy equipment, food processing equipment and hospital and sterilizing equipment has been reduced to 50 per cent tin content. Previously, an unlimited tin content was permitted in solder for these uses.

OPS Pegs Aluminum Prices

OPS set new dollars-and-cents ceiling prices on secondary aluminum ingot at primary ingot levels and on aluminum scrap at relative levels, effective as of June 29. The new ceilings are 30 to 50 per cent below the previous prevailing market figures.

Prices of secondary aluminum ingot and aluminum scrap rose more sharply than primary aluminum prices following outbreak of the Korean War. Consequently, the general price freeze fixed primary ingot prices at about 20.00c a pound while secondary ingot was selling between 30.00c and 35.00c and scrap at 25.00c a pound.

New ceilings represent a rollback to levels reflecting the value of metallic content in terms of current prices for primary aluminum. Ceilings for various grades of aluminum scrap are set sufficiently below secondary ingot prices to provide an adequate margin for smelters and to encourage collection and segregation. CPR 54 also provides quantity premiums to encourage accumulation and distribution by sellers of relatively large lots.

A typical ceiling for secondary aluminum ingot is 20.50c a pound for 10,000 pounds or more for the alloy AXS679. In the scrap category, segregated S type copper-free solids, as an example, are priced at 13.00c a pound for quantities of 40,000 lb or more.

Export Licensing Extended

Certain types of nonferrous metals, alloys and products have been added to the list of commodities subject to licensing against export quotas under CMP. Effective Aug. 1, Office of International Trade will revoke all licenses covering controlled commodities issued prior to June 1, 1951, unless revalidation of the licenses has been requested by the licensees and granted by OIT.

The commodities affected by this action include: Nickel silver, containing 40 per cent or more copper, in the form of bars, rods and sheets; beryllium copper rods, strips and wire and beryllium powder containing copper; copper alloys, if copper content is 40 per cent or over, except brass, bronze, nickel or gold, in the form of bars, rods, bare wire, shapes, sheet, strip, plate, rolls, pipe, tubing, castings, and powder; beryllium metal tubes, phosphor-copper powder, cupro-nickel strips, cupro-nickel wire, copper-nickel wire, nickel-silver wire; building wire and cable, weatherproof and slow-burning wire, and insulated copper wire.

To facilitate the changeover to CMP, exporters who hold validated licenses issued before June 1 are permitted to continue to export controlled materials under those licenses, provided the materials are produced prior to July 1 and are loaded aboard an exporting carrier by midnight on July 31.

STEEL'S Metal Price Averages for June, 1951

(Cents per pound)

Electrolytic Copper, del. Conn.	24.500
Lead, St. Louis	16.800
Prime, Western Zinc, E. St. Louis	17.500
Straits Tin, New York	117.962
Primary Aluminum ingots, del.	19.000
Antimony, f.o.b. Laredo, Tex.	42.000
Nickel, f.o.b. refinery	56.500
Silver, New York	88.492

Harvey Places Plant Orders

Harvey Machine Co., of Torrance, Calif., is proceeding with its project to build an aluminum plant near Kalispell, Mont. The company has placed orders for around $30 million worth of construction and electrical equipment. The firm's request for an RFC loan of $70 million has not yet been approved, an official says.

Canada Allocates Lead

Effective July 1, primary lead, refined secondary lead, slab zinc and cadmium were placed under direct allocation in Canada by the Non-Ferrous Metals Division of which F. V. C. Hewett is director.

These metals have been under informal rationing by producers for months, but this procedure is now replaced by an order approval system. Approval will not ordinarily be given where inventories are deemed to be excessive. It is not expected, however, that initially the supply of these metals to Canadian industry will be materially changed.

The new order is similar to those issued a short time ago for nickel, copper and aluminum. In addition to regulating the rate of metal consumption for commercial purposes, the orders prevent surplus buying. Purchase of lead and zinc in quantities of 2000 pounds or less in any one month and the sale of cadmium by the electroplating supply houses to electroplaters, will not require approval.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 29.00c; 88-10-2 (No. 215) 44.50c; 80-10-10 (No. 305) 36.00c; No. 1 yellow (No. 405) 25.50c.

Zinc: Prime western 17.50c; brass special 17.75c; intermediate 18.00c, East St. Louis; high grade 18.85c, delivered.

Lead: Common 16.80c; chemical 16.90c; corroding 16.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.00c; grade 2, 17.75c; grade 3, 17.25c; grade 4, 16.50c. Prices include freight at c.l. rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 106.00.

Antimony: American 99-99.8% and over but not meeting specifications below 42.00c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 42.50c; f.o.b. Laredo, Tex. for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%; base sizes at refinery, unpacked, 56.50c; 25-lb pigs, 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, large lots, New York, $210-213 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b., Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del.; special or patented shapes $2.80.

Cobalt: 97.99%, $2.10 per lb for 500 lb (kegs); $2.12 per lb for 100 lb (case); $2.17 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 87.75c per oz.

Platinum: $60-93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; effective May 23, 1951)

Sheet: Copper 40.18; yellow brass 37.28; commercial bronze, 95% 40.18; 90% 39.78; red brass, 85% 38.86; 80% 38.47; best quality, 38.07; nickel silver, 18% 50.99; phosphor-bronze grade A, 5% 59.42.

Rod: Copper, hot-rolled 36.03; cold-drawn 37.28; yellow brass free cutting, 31.70; commercial bronze, 95% 39.87; 90% 39.47; red brass 85% 38.55; 80% 38.16.

Seamless Tubing: Copper 40.22; yellow brass 40.29; commercial bronze, 90% 42.44; red brass, 85% 41.77.

Wire: Yellow brass 37.57; commercial bronze, 95% 40.47, 90% 40.07; red brass, 85% 39.15, 80% 38.76; best quality brass, 38.36.

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 28.67-30.295; l.c.l. 29.17-30.92; 100,000 lb lots 28.545-30.295; weatherproof, f.o.b. eastern mills, c.l. 30.10, l.c.l. 30.18; 100,000 lb lots 29.35; magnet, del., 15,000 lb or more 34.50, l.c.l. 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range Inches	Widths or Diameters, In. Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	....	....
0.135-0.096	12-48	30.6	....	....
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.6	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Minimum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over

Diam. (in.) or distance across flats	—Round— 178-T4	R317-T4, R317-T4	—Hexagonal— 178-T4
0.125	52.0	....	....
0.156-0.188	44.0	....	....
0.218-0.313	41.5	....	....
0.375	40.0	46.0	48.0
0.406	40.0	....	....
0.438	40.0	46.0	48.0
0.469	40.0	....	....
0.500	40.0	46.0	48.0
0.531	40.0	....	....
0.563	40.0	....	45.0
0.594	40.0	....	....
0.625	40.0	43.5	45.0
0.688	40.0	....	45.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	....	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	....	....
1.625	36.5	....	39.5
1.688-2.000	36.5	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh). Sheets: Full rolls, 140 sq ft or more $22.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $22.00 per cwt. Traps and bends: List prices plus 60%.

ZINC

Sheets, 24.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 23.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 23.50-24.50c; over 12-in., 23.50-24.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat untrimmed 37.6c; oval 37.19c. Cast 37.376c, delivered in eastern territory.

Copper Cyanide: 70-71% Cu, 100-lb drums, 1000 lb 60.8c, under 1000 lb 62.8c, f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98% ½-oz ball, in 200 lb drums, 1 to 900 lb, 19.00c; 1000 to 19,900 lb, 18.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 200 lb, 29.25c; over 200 lb 28.25c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 68.50c; 10,000 to 30,000 lb, 69.50c; 3000 to 10,000 lb, 70.50c, 500 to 3000 lb 71.50c; 100 to 500 lb, 73.50c; under 100 lb, 76.50c, f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 35.00c; 400-lb bbl. 33.00c; up 10,000 lb, 32.50c; over 10,000 lb, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 79.20c; 100 or 350 lb drums only, 100 to 600 lb, 64.56c; 700 to 1900 lb, 62.06c; 2000 to 9900 lb, 60.28c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.375
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	10.75
Phos. bronze, A	27.00	26.75	25.75

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group I: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material.

Group II: No. 1 soft red brass solids 19.50; No. 1 composition borings 19.25 per lb of Cu content plus 83 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 78 cents per lb of tin content; unlined red car boxes 19.25; lined red car boxes 18.25; cocks and faucets 16.75; mixed brass screens 16.00; zinc bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment)

Unsweated zinc dross, 12.25c; new clippings and trimmings, 14.50; engravers' and lithographers' plates, 14.50; die cast slabs, min. 90% zinc, 12.25; old zinc scrap, 11.25c; forming and stamping dies, 11.25; new die cast scrap, 10.75; old zinc die cast radiator grills, 10.50; old die cast scrap, 9.50c.

Lead Scrap Ceiling Prices

(F.o.b. point of shipment)

Battery lead plates, 17.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more, less 2.25c, in lots less than 15,000 lb. Used storage batteries (in boxes) drained of liquid, 6.00c for 15,000 lb or more, 6.40c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap or lead content of lead-covered cable scrap, 15.25c per lb. In addition, brokerage commissions are permitted.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

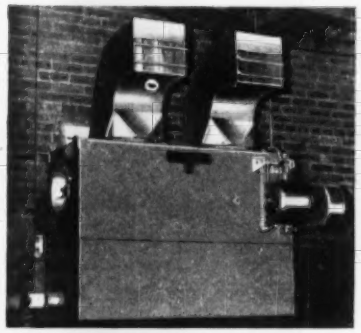
Segregated plant scrap: 2s solids, copper free, 10.50; high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50; Mixed plant scrap: Copper-free solids, 10.00; dural type, 9.00; Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

DAILY PRICE RECORD

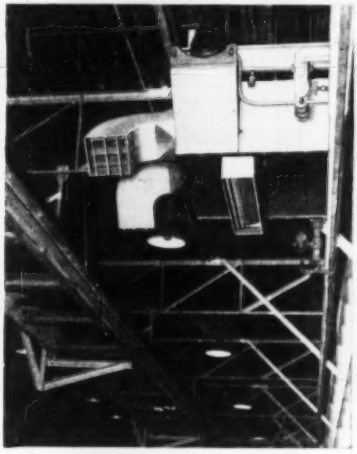
1951	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
July 2-5	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June 28-30	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June 18-27	24.50	16.80	17.50	106.00	19.00	42.00	56.50	87.75
June 15-16	24.50	16.80	17.50	111.00	19.00	42.00	56.50	87.75
June 14	24.50	16.80	17.50	118.00	19.00	42.00	56.50	87.75
June 13	24.50	16.80	17.50	123.00	19.00	42.00	56.50	87.75
June 8-12	24.50	16.80	17.50	128.00	19.00	42.00	56.50	87.75
June 7	24.50	16.80	17.50	136.00	19.00	42.00	56.50	87.75
June 1-6	24.50	16.80	17.50	136.00	19.00	42.00	56.50	90.16
June Avg	24.50	16.80	17.50	117.962	19.00	42.00	56.50	88.492
May Avg	24.50	16.80	17.50	139.923	19.00	42.00	50.50	90.16
Apr. Avg	24.50	16.80	17.50	145.735	19.00	42.00	50.50	90.16

NOTE: Copper, Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime west, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99% del; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%; base sizes at refineery unpacked. Silver, open market, New York. Prices, cents per pound, except silver, cents per ounce.

HEAT WHERE IT'S NEEDED!



with "Buffalo" UNIT HEATERS



SUSPENDED LOWBOY IN BAR MILL takes no floor space. The long, narrow construction of the HIGHBOY unit heaters, too, is well suited to steel mill installation. HIGHBOY and LOWBOY heaters are also used to supply makeup air where exhausters are used extensively, and to supply straight ventilation in many cases where heat is not required.

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Sheets, Strip . . .

Sheet and Strip Prices, Page 129 & 130

Pittsburgh—One-week grace period starting July 1 to allow carryovers to be reduced before initiation of CMP will help many unfortunate nonrated customers who have waited many months for sheets. When mill delays occurred in the past, the rated orders received preference at the expense of nonrated. Grace period will allow producers to work on their backlogs; carryovers will be reduced, but not eliminated. There are no other signs of relief on hot and cold-rolled sheets. Defense and directives will take greater tonnage in July than heretofore.

New York—Some free tonnage in cold-rolled sheets may be available in September, although on a more restricted scale than in August. Actually there have been some cancellations of cold sheets for August by stove and cabinet makers and by some other manufacturers of durable goods. Sellers will have until the middle of this month to set up schedules for September on major grades and, as they are in the middle of appraising extent of their CMP allocations, they will soon know approximately where they stand with respect to unrated work. All seem confident they will have some such tonnage to spare.

Cincinnati—Bookings by mills indicate progressive tightening in the sheet supply for nonrated users. Transition to CMP is attended by some confusion and by further realization that directed programs and defense needs are absorbing a steadily increasing tonnage.

Steel Bars . . .

Bar Prices, Page 129

New York—Hot carbon bar sellers report a flurry of orders for September as consumers last week certified DO ratings under CMP. Many small consumers got in certifications early as Washington was able to process their applications rapidly. However, most of the larger consumers were not able to get their allotments before last week, so that tonnagewise the great bulk of conversion from DO's to CMP's fell within the past few days. A further heavy influx of these orders is expected July 9 inasmuch as the official deadline fell on July 7, at the end of the week. Most mills plan to take a liberal view of July 9 receipts. They will then have until the end of the second week in July to schedule these and other orders before the deadline for September rollings. In the case of alloy bars, which require a longer lead time, September is already out of the question and such conversions to CMP as are now being made won't become effective on mill books before fourth quarter.

Boston—Supply rather than prices occupies most consumers, but an increase in costs confronts them if labor gets another round for which demand is expected late next quarter. Nickel and tungsten alloy bar prices will probably advance shortly, reflecting higher costs of those alloying elements, grades taking more than five per cent nickel. Alloy bar schedules are hampered by delays and suggested changes in approval of melt sheets.

Philadelphia—Hot carbon bar producers have received most CMP allotments for September and are now engaged in setting up schedules before the deadline of July 15. There will be some "free" tonnage, although the volume will be down from the preceding month, especially in view of expected arrearages at the end of August. In addition to CMP allotments for September, they are also receiving some for fourth quarter.

Chicago—Despite curtailed operations in the automotive industry, demand for forging billets and cold-finished bars is unabated. Barmakers' schedules are virtually completely filled for third quarter with DO and other rated business.

Plates . . .

Plate Prices, Page 129

Philadelphia—Most plate consumers have certified their DO-rated tonnage for September under the CMP program. While July 7 was the official deadline, an overflow into July 9 is expected and may be given consideration in view of the weekend circumstances.

Where CMP allotments are larger than their scheduled DO-rated tonnages for September, mills are expected to work in the extra amounts at the expense of such other DO-rated tonnages as may not be certified. This will not be done at the expense of unrated work; there will be so little free tonnage available that Washington prefers to keep it reasonably intact so as to support operations at plants engaged in civilian work. On the other hand, there may be some cancellations where CMP allotments do not equal the amount that various consumers may have been able to place under DO-ratings for September. Thus, cancellations may tend to offset extra allotments with a minimum disruption otherwise.

One difficulty confronting some consumers relates to the recent increase of 5 per cent in the DO set-asides, half of which tonnage is for maritime work and the remainder for tank cars. Tank car tonnage is principally that rolled on wide mills and various producers haven't either the facilities or the capacity left to handle such type of work.

The Coatesville producer, which suspended operations on its 140-inch mill for ten days beginning July 1, for repairs, has started work on construction of two 2 million-gallon oil storage tanks. These facilities will provide a reserve for use whenever there is a shortage in gas supply.

Under a recent order, M-46, all oil country goods rated DO-48 have been automatically converted to CMP. It is understood DO-97, having to do with maintenance, repairs and operations, also has been converted.

New York—Plate sellers received a heavy volume of orders last week covering the conversion of DO tonnage to CMP allotments. Consumers tried to beat the deadline of July 7 for such conversion. Work this week will be devoted largely to arranging schedules and, if possible, booking some "free" tonnage before the expiration of the 45-day lead time for September. However, it is doubtful if much unrated tonnage can be worked in, particularly in view of the heavy set-asides for defense work and the probable arrearages at the end of August. Some CMP allotments are being received for the fourth quarter. Consumers protected by CMP are permitted to order in advance of 70 per cent of what they are scheduled to receive under priority in the third quarter. Later, when final allotments are made for fourth quarter, this percentage may be revised upward.

Boston—Plate fabricating shops using 400 tons or less annually look for better times under CMP. Most users in this category have allotments certified. Many in this group qualify as warehouse buyers, but base plate quotas with distributors against 85 per cent allocation from mills are low.

Pittsburgh—Demand for light and heavy plates continues active with defense requirements and directives taking larger portions for July. Building construction demand for plates eased last week, but not enough to be reflected in plate supply.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 129

Seattle — Bethlehem Pacific Coast Steel Corp.'s local plant has a large backlog and will continue operations during vacation period. Northwest Steel Rolling Mills Inc., this city, is down for the first two weeks in July for overhaul and repairs. Pressure for reinforcing bars is insistent and producers continue to refuse orders beyond capacity. Delivery on new business is about six months in advance.

Structural Shapes . . .

Structural Shape Prices, Page 129

New York—Pending clarification of the effect of CMP on future supply of shapes, there is a general hesitancy by both fabricators and contractors to figure on work that is not definitely of a defense or important public character. There is much tonnage that may be approved ultimately by Washington, but wherever there is doubt there is disposition to coast for the time being. Fabricators are particularly concerned about obtaining steel for work already being processed, rather than obtaining new contracts. Some have unrated jobs that they have had on their books for a considerable time and in some cases have progressed with the fabrication only to find themselves tied up by lack of steel. Relief likely will be provided in these cases, but it has been slow coming through. Fabricators are even having trouble obtaining steel for rated work. Some believe that by the end of the third quarter, if not before, they will be justified in either canceling, or setting back indefinitely, various unrated jobs because of the steel shortage. In such an event, backlogs instead of being extended 12 to 14 months, as was the case earlier in the year, may be cut in half.

Boston—Not only are construction restrictions and controls over plain material curbing fabricated structural steel inquiry, but prices and costs are putting a damper on some public work and marginal projects. Bridge

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steel quotations and other materials are consistently over office engineer estimates. Reversal in the price trend however, is reflected in unit bids on fabricated and erected structural steel for the last two superstructure contracts bid less than one month apart for Central Artery, Boston. Both are large tonnage inquiries totalling 19,000 tons. Shop and field work is similar. For carbon structural steel for bents, the low price fell to 23.65c per pound from 25.20c and on silicon steel to 25.70c from 28.30c. These prices were quoted by the same shop, both contracts.

Pittsburgh—Structural demand is increasing slightly, with emphasis on light beams and channels. Heavy industrial and rated construction keeps demand at peak. Defense requirements and directives account for as high as 85 per cent of one producer's output. Building bans by NPA have not made any significant additional tonnage available for the nonrated purchaser, and little relief is expected until fall.

Seattle—Heavy structural placements are pending. Plants are booked well forward. There is some difference of opinion as to the effects of CMP. The supply situation is serious and fabricators hesitate to bid beyond current steel inventories.

Wire . . .

Wire Prices, Page 131

Boston—Rod and wire consumers in this area normally buy 76 per cent of requirements from New England mills. With advent of controls and heavier demand this ratio roughly holds. But available tonnage, notably rods, has not kept pace. Rod producers, to meet conversion allocations, sell tonnage at expense of their own finishing operations and in turn, semifinished to nonintegrated mills fall short of requirements. About 335,350 tons of rods went into finished wire in New England last year.

Chicago—Some easing in demand for nails is anticipated by producers as a result of government restrictions imposed on home construction. All other wire products are expected to continue tight.

Joliet and Waukegan, Ill., plants of American Steel & Wire Co. closed for two weeks starting July 2 for the annual vacation. Neither plant makes raw steel.

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Stainless Steel . . .

Stainless Steel Prices, Page 133

Pittsburgh—Two leading producers of stainless steels advanced prices to cover the increased cost of nickel, which rose 6 cents a pound June 1. Other producers are expected to take similar action soon.

Allegheny Ludlum Steel Corp. advanced prices June 26 on nickel-bearing products after absorbing the cost of the first 5 per cent of contained nickel. The price advance applies to all company produced steels containing more than 5 per cent nickel and includes stainless, high temperature and electrical alloys. The advances cover the actual increase in nickel costs only and, to reflect these actual increases, prices have been calculated to the fraction of a cent.

United States Steel Co.'s subsidiaries revised nickel-bearing product prices on July 2. The advances ranged from ¼-cent to 1 cent a pound.

Pig Iron . . .

Pig Iron Prices, Page 128

Chicago—Jobbing foundries are taking all the iron allocated to them by suppliers despite the fact that melting rates on the whole are down somewhat. Nevertheless, jobbing shops are holding up better than automotive foundries which are affected by limitation orders on car assemblies. Vacation shutdowns now starting are reducing iron consumption, but are not interfering with the intake of raw materials during such period. Of the district's 42 blast furnaces, 41 are operating.

New York—With various foundries back in operation after a week's suspension for vacations, pressure for pig iron is extremely heavy, although some plants are still down for another week for vacations. Only a relatively few foundries have been forced to curtail operations because of shortage in pig iron. Most of them have little inventory, but have been able to keep "heads above water." Where there are curtailments, they are due primarily to an easing in demand from consumers of castings, some of whom report a falling off in demand for products for which castings are the major components; some, because of inability to obtain other components with which to complete assemblies.

Buffalo — Unless Korean peace moves alter the situation, not much change is expected at this time in the merchant pig iron market. Melting operations have been pared by vacation periods, but consumers are not postponing delivery dates. To make sure stock is received, small forces are kept on to handle receipts. Defense work is expected to be heavy even after the Korean war ends.

The consumer with the only idle stack in the area is expected to relight that unit within the week, but another stack will go down shortly for relining.

Philadelphia—Pressure for foundry iron was lighter last week due to suspensions at various plants for vacations. However, consumers likely will take up all iron offered. Demand for basic is sustained at a high rate, ingot operations holding close to capacity or higher.

Pittsburgh — Demand pressure for all grades of pig iron is high, partly because of the scrap shortage. Although demand is great and supply limited, no foundry has curtailed operations for this reason. With some foundries taking combined vacations, it is hoped pig iron inventory can be built during the period. Production continues at peak levels.

Cincinnati—Foundry vacations are cutting the melt in this district, but demand for pig iron shipments continues heavy for stockpiling.

Iron Ore . . .

Iron Ore Prices, Page 135

Cleveland—Shipments of Lake Superior iron ore rose to a new peak for the season to date and exceeded last year's best rate, amounting to 3,145,203 tons. This brought the cumulative total to July 2 to 32,651,692 tons compared with only 22,019,932 tons for the like period a year ago. The increase for the season over last year for United States ports alone amounts to 10,486,610 tons.

Youngstown — First large scale shipments of iron ore from Liberia are being smelted in Republic Steel Corp.'s Youngstown and Warren open-hearth plants. Republic's Youngstown plant got 33 carloads and the Warren plant got 17 carloads as their share of the 10,000 tons that arrived in the first shipment to Baltimore. Republic executives here expect regular shipments will enable them to boost output sharply here, since the ore replaces Old Bed Ore from New York state as the open-hearth charge ore.

Warehouse . . .

Warehouse Prices, Page 135

Pittsburgh—Distributors are receiving around 85 per cent base period receipts as specified under M-6, but increased receipts go into greater sales volume with no possibility for inventory-building. Under CMP, high demand levels with limited receipts will continue to prevail. Hot and cold-rolled carbon and alloy bars, all sizes, are the scarcest warehouse product. Plates and hot and cold-rolled sheets are in critical supply, along with structurals. Some warehouses have received rated inquiries for steel in production quantities in hopes that better deliveries can be promised. Distributors are naturally reluctant to accept such orders.

Boston—Alloys, including stainless, and tool steel, largely distributed through warehouse, usually account for better than 20 per cent of total bar tonnage in this area. Alloy stocks with distributors are far below normal. Replacement depends on passing on defense certificates against warehouse orders. Demand has slackened little.

New York — Certification of requested CMP steel allotments in full to small consumers will include many who buy in warehouse quantities. Users in this category, unless over-estimating requirements, get about what they ask in terms of tonnage. Quarterly requirements defining small users are: carbon steel, 100 tons; and stainless, 500 pounds. With

more warehouse quantity buying likely, 85 per cent allocation to distributors may be overloaded, notably where base quotas on some carbon products are low.

Philadelphia — Distributors anticipate at least as much tonnage from the mills in July as they got in June. Ordinarily, July would be less active in view of vacation at various metalworking plants. Demand is so greatly in excess of supply this year, warehouses believe business during the vacation period will be governed by the amount of steel they have to sell.

Cincinnati—Warehouses are receiving more extensive lists of wanted steel, as fabricators' reserves shrink. Mill shipments are far below M-6 tonnage, so that jobbers' stocks generally are at the year's lowest level.

Chicago — Consumer pressure for warehouse steel is somewhat less intense than had prevailed for many weeks, but the easing is growing no deeper. Individual orders are for fewer items and for smaller quantities. Buying also is mainly for short term use. Nevertheless, total volume is more than distributors can accommodate. Building up of stocks still is impossible. Among tightest items are cold-finished bars, structurals and plates.

Tungsten Ore . . .

Washington — Tungsten production is being resumed on a small scale at the San Dong mine in Korea. War damage suffered by this mine was confined largely to surface equipment, but production is not expected to increase rapidly because of parts replacement problems and the dislocation of labor.

China was formerly the principal source of tungsten for the United States. General Services Administration is contracting for most of the Siamese tungsten production. Although GSA has contracted for more than 1 million pounds of tungsten ore on the world market, considerable doubt is expressed by government officials that this quantity will reach this country. To keep production of all tungsten-using industries at a normal level, imports of 800,000 pounds of tungsten-bearing ore is needed monthly.

Domestic production in April amounted to 507,000 pounds compared with 585,000 pounds in May. Pre-Korea production was about 450,000 pounds monthly.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 133

Pittsburgh—Oven coke demand has slackened slightly as most foundries concentrate on obtaining pig iron and scrap. Some steel mills and foundries have been able to build small inventories of coke. Few purchasers have taken Connellsville beehive foundry in preference to oven grades and as a result the former market is slow. Shipments of this grade to other consuming areas continue. Market will become slower here through this month because of vacations and repair of one blast furnace. If coke users decide to accumulate large inventories, smaller users may have difficulty later in obtaining full requirements.

Chicago—Foundry coke demand is considerably easier. This is attributed to lower operations of automotive foundries and fact that jobbing foundries are less anxious than formerly to stockpile fuel.

Scrap . . .

Scrap Prices, Page 136

Pittsburgh—All grades of scrap are moving somewhat slower here due to summer vacations, retooling for defense items and the actual scarcity of material. Dealers and brokers are attempting to achieve an equitable distribution of limited supplies, but varying demand for different grades makes the task difficult. Practically no reserves are held by steel plants and foundries; operations in some cases have been curtailed because of the shortage. Proposed lumping of grades into one designation might eliminate upgrading, but would not cause the scrap to move faster.

New York—While steel scrap supply is increasingly scarce, some easing in cast grades is reported. Some plants, which have been taking upgraded material, have developed sufficient inventories to hold them for a while and this situation is tending to free supply for other users who have been refusing to take such material. Some dealer steel scrap is being allocated by Washington for the first time.

Buffalo — Uncertainty gripped the scrap market here as dealers were wary over what might happen in the event of peace in Korea. While a peaceful settlement is not expected to bring about any appreciable change immediately, the market did show its first sign of easement as dealers reported supplies of cast material had increased to a point that no ceiling bids were left unfilled. No sales were reported under control levels. The cast situation also had as a factor a vacation shutdown of one of the leading consumers of this item. Steelmaking grades continue tight and strong.

Two barge fleets, carrying approximately 7000 tons, arrived during the week from the eastern seaboard.

Philadelphia—For the first time, basic open-hearth scrap at dealers' yards has come under allocation. This reflects the growing stringency at some mills and the desire of government officials to keep scrap developed locally from going outside the district. Scarcity in steel grades is accentuated by shrinkage in industrial scrap due to curtailment of operations at various metalworking plants for vacations. Cast supply is somewhat easier as some consumers who have been taking upgraded material are in a fairly comfortable position and are leaving more tonnage available for other consumers.

Chicago — Some slight improvements in scrap inventories are being achieved here as receipts of melting material exceed consumption.

Gary works of United States Steel Co. now has 6½ days supply versus 6 days during past two weeks. NPA has issued scrap allocation directives, but the tonnage is only starting to arrive. Inventory level at the com-

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While all mills expect to hold or improve their positions during the next several months, prospects for building substantial stocks for winter are dim.

Detroit—Scrap generation in automotive plants was about at the same level in June as in May. A decline is likely, of course, in July. The number of instances where scrap is moving from dealers' yards under government allocation has increased and is now prevalent on the Detroit perimeter, although not yet in the city.

Cincinnati—Reliance on allocations of iron and steel scrap is on the uptrend. Predictions are that 80 per cent of tonnage will be on directives within two or three weeks. Mill reserves are low, with slight chance at improvement. Comparatively, cast is in better supply. District collections are sagging.

Seattle—Scrap receipts are increasing, but the rate of consumption is so high it is impossible to add to stockpiles and prepare for winter needs. Dealers are co-operating with mills in the scrap mobilization program. Additional offshore shipments are needed to care for the local situation. One Seattle plant has just received a 5000-ton cargo from Honolulu.

Conservation Programs Lag

Conservation programs in some respects are bogging down. An apt case is solders; earlier research centered around saving of tin with increased use of lead, silver and other metals in mixtures. Shortages have spread to other metals required in larger amounts for saving tin and no longer are researchers able to save one metal at expense of another. Not much progress one way or another is expected until there is an easing in one or more metals required in solders and this is not in sight.

Supplies of nickel are extremely tight, forcing consumers in this country to invoke conservation measures. By using smaller amounts of nickel with copper for flash plating, producers of electric houseware products, irons, toasters, hot plates, etc., are conserving considerable nickel, although small amounts are needed in plating to prevent corrosion; one company has reduced use of nickel anodes from 10,000 to 2000 pounds per month. This industry by overall conservation methods has reduced consumption of nickel by 50 per cent. Canning machinery builders are also saving nickel, substituting nickel silver, containing 18 per cent nickel, for a higher alloy with upwards of 62 per cent. Nickel alloys may be eliminated in all parts except those coming in direct contact with food.

Use of nickel for plating is restricted by an increasing number of industries, among them household sewing machines; only on functional parts, in contact with goods and thread, is nickel used for plating. For other parts, various corrosion-resisting processes are employed, bonderizing, Parkerizing and japaning. Some are bright zinc-coated, but tin is also costly, although price is lower since earlier in the year.

Copper for fractional horsepower sewing machine motors may become a limiting factor, but on whole material shortages have not substantially reduced production. Unless military requirements go over estimates, enough secondary aluminum is in sight for die-cast heads, also magnesium for some portable machine heads. Manufacturers are getting enough cast iron heads.

Lead and Tungsten Quotas

Export quotas of 1800 short tons of lead and 6000 pounds of tungsten for licensing during the third quarter of 1951 were announced last week by the Office of International Trade.

The same quantities were established for licensing in the second quarter.

The lead quota covers lead ore, concentrates, matte, and base bullion (lead content); scrap; pigs, bars and anodes; sheets and pipes; solder; and all types of lead manufactures (schedule B Nos. 650406-651598). The tungsten quota covers tungsten metal, stellite, wire shapes, alloys and carbide, except carbide tool blanks, tips, and inserts (schedule B No. 663900).

Canada . . .

Toronto, Ont. — R. H. Saunders, chairman, Ontario Hydro Electric Commission is overseas seeking to obtain more steel for the Hydro expansion program and to speed up delivery of steel already on order. Steel for the Hydro expansion has been promised at a rate of 1000 tons monthly until the 13,000 tons required from this source has been met.

For the 12 months commencing July 1, 1951, the Ontario Hydro Electric Commission will require an estimated 54,387 tons of steel to carry through its expansion program on schedule. For the balance of this year, Hydro needs 26,973 tons of steel of which 14,206 tons will be needed in third quarter and 12,767 tons in fourth qurater. Included in these requirements are structural steel, reinforcing bars, conduit and pipe.

Directors of Dominion Steel & Coal Corp., Sydney, N. S. have approved expenditure of $16 million in the third stage of its expansion program. Improvements at Sydney Works will enable the company to maintain an uninterrupted annual production of 720,000 tons of ingot steel and process this steel to finished products.

Manganese Ore . . .

Philadelphia—Recently, 5000 tons of manganese ore were imported from Greece, the first from that source to have been reported in a long time.

STRUCTURAL SHAPES . . .

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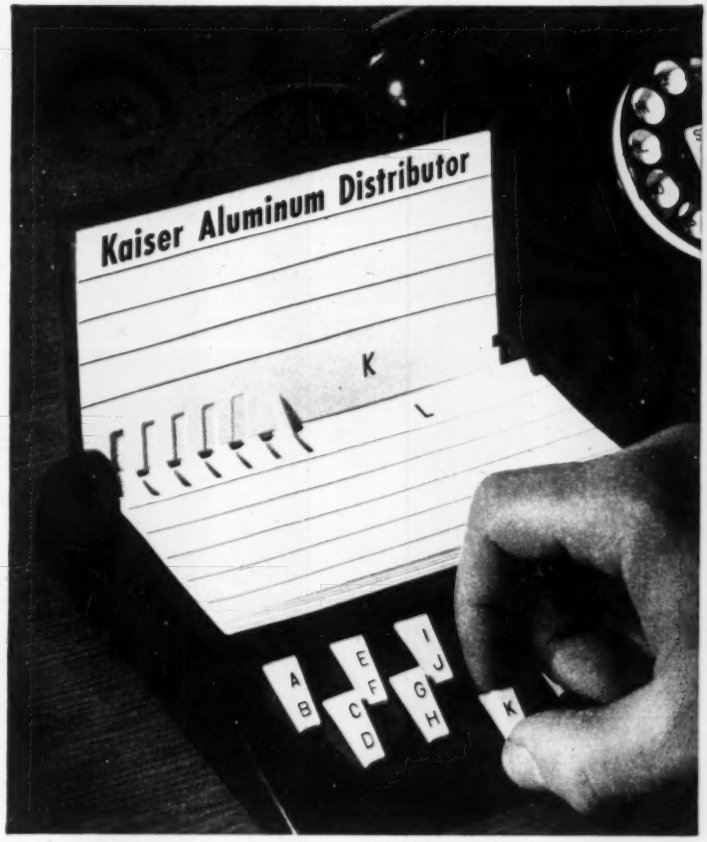

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SMALLER SPACE REQUIREMENTS—Space necessary to house your average raw material inventory can be devoted to production. Becomes a source of income rather than an expense.

Wash., to Pacific Car & Foundry Co., Seattle.

310 tons, foundry building, American Brake Shoe Co., Pomona, Calif., to Bethlehem Steel Co.

200 tons, elementary school building, New Britain, Conn., to Standard Structural Steel Co., Hartford, Conn.; Southern New England Construction Co., Hartford, general contractor; Scherer Steel Co., 50 tons, reinforcing bars.

200 tons, Alaska Road Commission bridges to Seattle Car & Foundry Co., Seattle; L. J. Bodrero, Seattle, general contractor.

214 tons, factory Becton-Dickinson, Rutherford, N. J., to Bethlehem Fabricators Inc., Bethlehem, Pa.

154 tons, plant construction, Little Falls, N. J., to J. G. Schmidt Iron Works, Passaic, N. J.

135 tons, construction work, American Viscose Corp., Parkersburg, W. Va., to Bethlehem Steel Co.

100 tons, galvanized, switchyard structures, Gulf States Utilities Co., Beaumont, Tex.; to Muskogee Iron Works, Muskogee, Okla.; Stone & Webster Engineering Corp., Boston, engineer-contractor.

100 tons or more, high school, Torrington, Conn., to Berlin Construction Co., Berlin, Conn.; bids to Topper & Griggs, Hartford, Conn.; Bozrahville Building Co. Inc., Torrington, general contractors.

STRUCTURAL STEEL PENDING

500 tons, warehouses, Army Engineers, Tobyhanna, Pa.; bids closed July 6; bids on 4125 tons to be asked later.

1500 tons, tainter gates, stop logs, etc., Chief Joseph dam, Washington state; Consolidated Western Steel Corp., Seattle, low, $963,730.

Unstated, schedule No. 2, Chief Joseph dam; Northwest Marine Iron Works, Portland, low to U. S. Engineer, $450,000.

Unstated, 38 crest gates, for Rock Island dam project, Washington state; bids to Stone & Webster, Boston, July 23.

Unstated, alert hangar, McChord Air Field, Washington state; J. H. Sellen, Seattle, low $379,391.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1100 tons, hangar and other work, Elelson air force base, Alaska; to Bethlehem Pacific Coast Steel Corp., Seattle; Morrison-Knudsen Co., general contractor.

250 tons, contract E-3, deck and structures, Embankment road connection, Central Artery, Boston, to Bethlehem Steel Co.; V. Barletta Co., Boston, general contractor.

115 tons, home for aged, Hartford, Conn.; 80 tons of bars to Scherer Steel Co., Hartford, and 35 tons of structurals to Lehigh Structural Steel Co., Allentown, Pa.; Southern New England Construction Co., Hartford, general contractor.

REINFORCING BARS PENDING

300 tons, Rock Island power dam construction; bids to Stone & Webster Engineering Corp., Boston, July 27.

230 tons, bulk storage facilities, Mukilteo, Wash., Navy terminal; Dahlgren Construction Co., Seattle, low $1,428,856.

Unstated, (plates also involved) ground storage and elevated tank, Mountain Home base, Idaho; J. H. Wise & Sons, Boise, low to U. S. engineer, Walla Walla, Wash., $192,547.

PLATES . . .

PLATES PLACED

2160 tons, tanks for various locations, Cities Service Oil Corp., to Chicago Bridge & Iron Works, Chicago.

130 tons, 1 million gallon stand pipe, Fairlawn, N. J., to Chicago Bridge & Iron Works, Chicago.

PLATES PENDING

2500 tons, 5 million-cubic gas holder, Philadelphia Gas Works Co.; bids asked.

1650 tons, gas holder, Allentown-Bethlehem Gas Co., Allentown, Pa.; bids closed.

1650 tons, gas holder, Harrisburg Gas Co., Harrisburg, Pa.; bids closed.

Unstated, additional storage facilities, Navy supply depot, Manchester, Wash.; MacRae Bros., Seattle, low $674,310.

PIPE . . .

STEEL PIPE PENDING

Unstated, 14,850 feet of 8 to 4-inch steel water pipe, Aloha-Huber district, Portland, Oreg.; E. N. Dolan, Portland, low $32,508.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Baltimore & Ohio, 8 diesel-electric switching locomotives, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Maine Central, two diesel-electric locomotive units, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Richmond, Fredericksburg & Potomac, three 2-unit 4500-hp diesel-electric locomotives, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

RAILROAD CARS PLACED

Baltimore & Ohio, 500 seventy-ton covered hopper cars, to Greenville Steel Car Co., Greenville, Pa.

New York, New Haven & Hartford, 550 seventy-ton hopper cars, to Pullman Standard Car Mfg., Chicago.

Wabash, 300 fifty-ton box cars, to General American Transportation Corp., Chicago.

RAILROAD CARS PENDING

United States Army, 400 fifty-ton box cars; bids asked.

Western Pacific, 500 gondola cars; bids soon.

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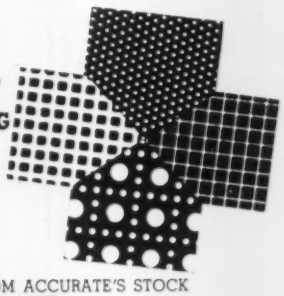

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Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Enlarges Pickling Service

A new job steel pickling plant is being operated by Rich Steel Pickling Co., 8019 Beach St., Los Angeles 1. The plant is capable of handling steel in sizes up to 30 feet long and 6 feet wide. Steel sheets, plates, coils, bars, pipes, structural shapes, stampings and a variety of other forms can be pickled, either dry or oiled. An outstanding feature of the plant is its method of applying a new "phosphate-protected" coating to all steel processed.

Builds Plant for Merck

Blaw-Knox Co., Pittsburgh, will build a plant to recover waste nitrogen oxides and convert them to usable nitric acid for Merck & Co. Inc., Rahway, N. J.

Resumes Prefabrication

Lane Pipe Corp., Bath, N. Y., will start the prefabrication of portable steel sheds and warehouses in November. New prefabrication machinery has been ordered. The firm is resuming this type of work after a lapse of several years, during which time it had concentrated on production of corrugated pipe.

Garco Machinery Co. Moves

Garco Machinery Co. moved to larger quarters at 21000 St. Clair Ave., Cleveland 17. The company offers new and used equipment.

Plans Coal Washing Plant

Sharon Steel Corp., Sharon, Pa., is planning to build a $1,250,000 coal washing plant at Rachel, W. Va. Construction of this plant is part of Sharon's $49 million five-year improvement program. The new washer will enable the company to boost its iron and steel output by removing ash.

To Open Tool and Die Shop

All Makers Inc., Buffalo, leased 4000 square feet of floor space at 277 Military Rd., that city, for a tool and die shop.

Plans $1.5 Million Expansion

Investment of $1.5 million in a construction program, covering a new erection floor, expansion of present test facilities, manufacturing space, and machine tools by Roots-Connersville Blower Corp., Connersville, Ind., is announced by John B. O'Connor, executive vice president, Dresser Industries Inc., Dallas, and Robert Owens, president Roots-Connersville, one of ten Dresser operating companies.

Files Plant Addition Plans

American Magnesium Corp., Pittsburgh, filed plans with Buffalo city officials to enlarge its plant building at 1880 Elmwood Ave., Buffalo.

Gear Firm to Enlarge Plant

Brown & Lipe Gear Co. filed plans with the city to enlarge its plant at 1738 Elmwood Ave., Buffalo.

Expands Chemical Facilities

Naugatuck Chemical Division, United States Rubber Co., New York, plans a major expansion program aimed at doubling production at its Baton Rouge, La., synthetic rubber plant. Construction will include a new administration building, laboratory, gate house, as well as new reactors, drying units and other production equipment.

West Point Mfg. Moves

West Point Mfg. Co. moved from its former location in Farmington, Mich., to its new and larger plant at 26935 W. Seven Mile Rd., Detroit 19. The company makes fixture clamps and fixture fittings.

Organizes McKin Tool Corp.

McKin Tool Corp. was organized at 625 Goodman St. S., Rochester, N. Y., by Harold E. McKinstry. The firm will specialize in precision work for industries and defense subcontract work.

Hamilton By-Product Coke

Hamilton By-Product Coke Ovens Ltd., Hamilton, Ont., purchased 44 acres located immediately north of the company's present coal dock. The company plans to extend the docks to the new harbor line.

Builds Machine Gun Factory

Buffalo Arms Inc., Buffalo, has broken ground in Akron, N. Y., for a $1 million plant that will be used for production of machine guns. The plant is scheduled to go into production by fall. The company is slated to get about $8 million in machine gun orders.

Forms New Warehouse

Edgcomb Steel of New England Inc., Nashua, N. H., was incorporated for the purpose of warehousing and distributing steel, brass and aluminum throughout eastern New England. Officers

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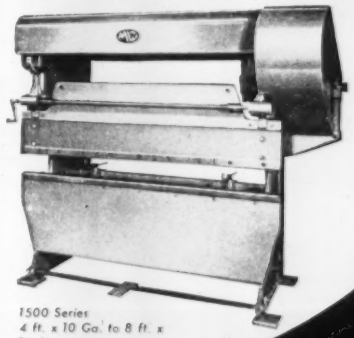

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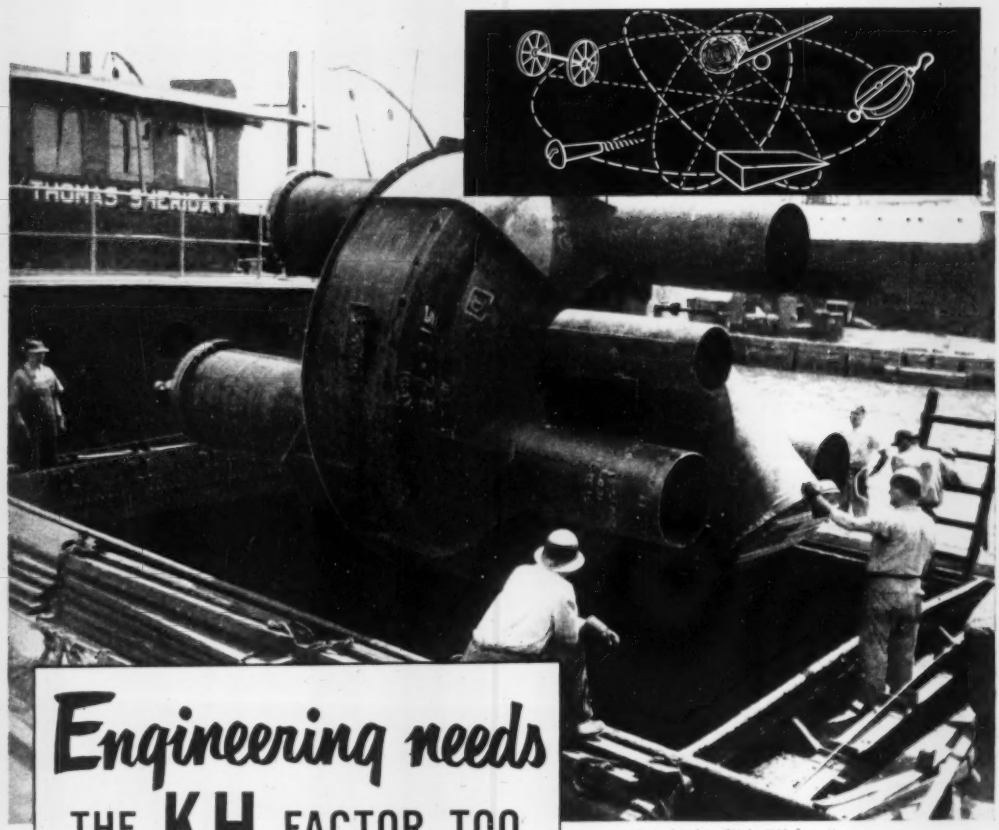

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of the corporation are: J. H. Roberts Sr., president; A. W. Moody Jr., vice president; J. H. Roberts Jr., treasurer; A. P. Stowe Jr., secretary. The corporation is operating on leased space in Textron Bldg. No. 4, Nashua, but plans to build a warehouse on West Hollis street where property for such a building has been acquired.

Nox-Rust To Build Plant

A 50 per cent increase in Nox-Rust Chemical Corp.'s output of its petroleum chemicals and rust-preventive products will result from construction of a new plant at 47th and Central avenue, Chicago. Some of its production facilities will be in operation early this fall.

Plans $3.4 Million Addition

Celanese Corp. of America, New York, is constructing a $3.4 million addition to its plant midway between Kingsville and Bishop, Tex.

Erie Forge Co. To Expand

Erie Forge Co., Erie, Pa., announced a $1 million expansion and improvement program, including rehabilitation of two open-hearth furnaces. The firm produces heavy steel forgings and castings for ships, turbines and generators.

Kennametal To Build Factory

Kennametal Inc., Latrobe, Pa., will erect a factory building near Bedford, Pa. The company will move its Mining Tool Fabricating Division to this site from the main plant to provide room for expansion of facilities for producing Kentanium, a new heat-resistant titanium carbide. Two months ago Kennametal purchased the Nevada Scheelite Co. to augment its supply of tungsten.

Simonds Expands Further

Simonds Saw & Steel Co., Fitchburg, Mass., plans a $1,250,000 expansion of its plant in Lockport, N. Y. This project is in addition to an expansion now under way which is providing two new shops at a cost of about $500,000.

Mexico Refractories Co.

Mexico Refractories Co., Mexico, Mo., appointed Arthur B. Morse as district manager in charge of its northern California office at 2040 Fourth St., Berkeley, Calif.

Plans $16 Million Expansion

Dominion Steel & Coal Corp. Ltd., Sydney, N. S., approved expenditures of $16 million involved in the third stage in the company's modernization and expansion program. The expenditures cover cost of a new battery of coke ovens, two open hearths, additional soaking pits, a high-carbon wire drawing plant, a machine shop and alterations to existing equipment to permit increased output from rod and billet mills.

Arbutus Steel Co.

Arbutus Steel Co. Inc., Arbutus, Md., equipped 10,000 square feet of space at Constance avenue and Pistorio road for the manufacture of bar and large span joints. Samuel M. Pistorio is president.

Metal Fabricator Moves

Eagle Sales Corp., Baltimore, aluminum and sheet metal fabricator, moved from 15 East 21st St. into larger quarters at 2010 Lovegrove St. Additional equipment is being installed. John A. Smoot is president.

Northrop Aircraft Expands

Northrop Aircraft Inc., Hawthorne, Calif., will build a branch factory at Anaheim, Calif., to make optical range finders for Army tanks. Another project, involving a joint expenditure of about $5.3 million by Northrop and the Air Force, calls for a 30 per cent expansion of the company's manufacturing facilities at Hawthorne, bringing that plant to more than 2 million square feet. The Hawthorne program provides for construction of a tooling building, a foundry, an assembly building, a hangar, a fuel test building and two large mezzanines in existing factory buildings. Three more mufflers for testing of afterburner-equipped Scorpion F-89 all-weather interceptors also will be built.

Extends Floating Drydock

Bethlehem Steel Co., Shipbuilding Division, 1100 Key Highway, Baltimore, plans to begin soon the addition of an 86-foot extension to its floating drydock, giving it a total length of 686 feet.

Economy Die & Gasket Co.

Economy Die & Gasket Co., Baltimore, is erecting a 10,000-square foot factory building at 901 North Newkirk St. It should be ready for occupancy shortly. The company has been occupying smaller facilities at 1001 Rectory Lane.

Operates New Plant

When Aeroquip Corp., Jackson, Mich., placed its Burbank, Calif., plant in full operation in June, the company completed its extensive expansion program. The new plant is operated by Aero-Coupling Corp., an Aeroquip subsidiary. Other phases of the expansion program include the addition of a building to its main plant in

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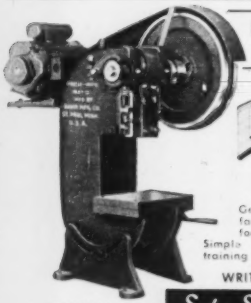

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Jackson and the acquisition of another subsidiary, Metalco Inc., with a plant in Cheboygan, Mich. Aeroquip manufactures flexible hose lines, self-sealing couplings and other products used on aircraft and numerous industrial products.

Plans New Electronics Plant

In a move designed to double its manufacturing capacity, Amperex Electronic Corp., Brooklyn, N. Y., plans to build a plant in Hicksville, Long Island, N. Y. The company makes electron tubes.

Will make Electronics Items

Dalmo Victor Co., San Carlos, Calif., plans erection of a 10,000-square foot factory building at Shipley, Md. The company will manufacture electronics equipment, largely for the Westinghouse Electric Corp., whose 400,000-square foot plant is now under construction at Friendship Airport, Baltimore. The plant will employ about 75.

Independent Can Moves

Independent Can Co., maker of plain and lithographed metal containers, Baltimore, moved to 934 Lakewood Ave., where it will occupy more than 40,000 square feet, or double its recent space. Harry L. Huether is owner.

Kaiser Transfers Offices

Product sales offices of Kaiser Aluminum & Chemical Sales Inc., for electrical conductor and rod, bar and wire, are being transferred to the company's general sales offices, 919 N. Michigan Ave., Chicago, effective July 10. They have been located at the Kaiser aluminum plant at Newark, O. Gillette N. Houck is in charge of sales for both product divisions.

Will Distribute Furnaces

Bigelow-Liptak Corp., Detroit, appointed Otto von Perbandt as its representative in southern Ohio, part of Indiana and all of Kentucky. His headquarters will be at 906 Main St., Cincinnati. Bigelow-Liptak manufactures industrial furnaces.

Cleco Appoints Distributors

Cleco Division, Reed Roller Bit Co., Houston, appointed Franklin Supply Co., Providence, R. I.; J. Heller & Sons Inc., Newark, N. J.; Somerset Pneumatic Inc., Somerville, N. J., Dawson Tool & Abrasive Inc., Seattle; and Cohen Auto Parts Inc., Erie, Pa., as distributors for Cleco products in those areas. Cleco makes air tools and accessories.

Allis-Chalmers Names Agent

Industrial Supplies Co., Steubenville, O., was named a distributor for Allis-Chalmers Mfg. Co.'s motors and controls in eight eastern Ohio and four northern West Virginia counties. Louis Berkman is president and treasurer and H. S. Monheim is vice president of Industrial Supplies Co.

Tinnerman Products Inc.

Visualizing a larger potential use for Speed Nuts among automobile repair shops, Tinnerman Products Inc., Cleveland, organized jobber outlets to make its automotive replacement kits more readily available. Special automotive manufacturers representatives will promote the sales program through jobbers who deal directly with users throughout the country.

OLD SOLDIERS: Trucks are parked in lines for reallotment to the Army Transportation Corps after being completely rebuilt and fitted at the Atlanta Army Ordnance Depot. The vehicles are sent in from combat and field areas

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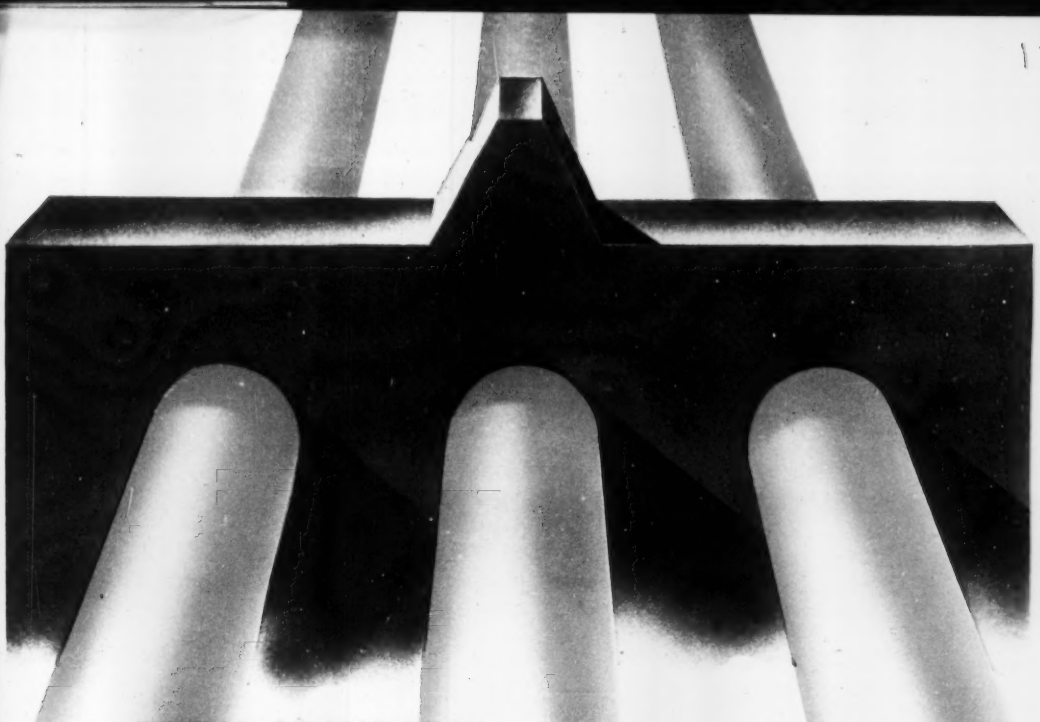

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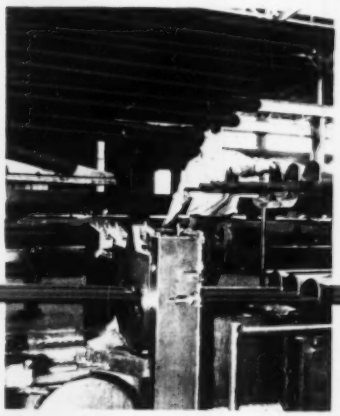

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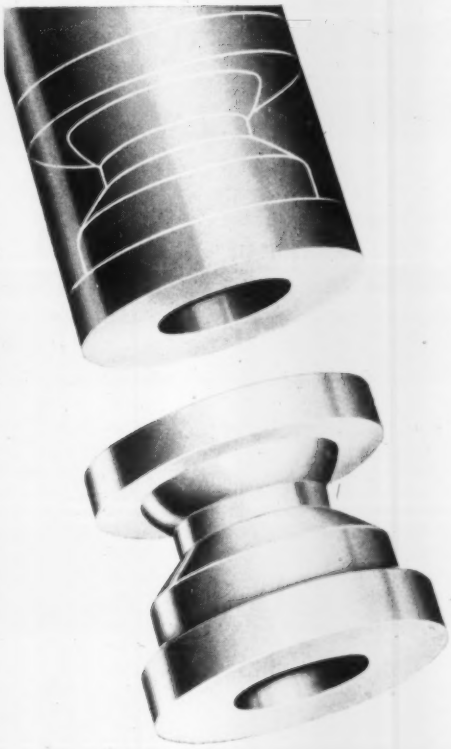

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